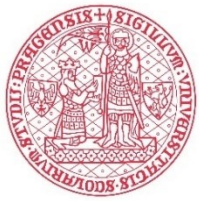
Univerzita Karlova

1. lékařská fakulta

Studijní program: Psychologie

Studijní obor: Lékařská psychologie a psychopatologie



UNIVERZITA KARLOVA
1. lékařská fakulta

Mgr. Klára Bártová, Ph.D.

Sexuální chování a preference v evolučním kontextu

Sexual behavior and preferences in evolutionary perspective

Disertační práce

Vedoucí závěrečné práce: prof. PhDr. Petr Weiss, PhD., DSc.

Konzultantka: Mgr. Kateřina Klapilová, Ph.D. (ECPS)

Praha, 2020

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V Praze, 25. 6. 2020

Klára Bártová

Podpis

Identifikační záznam:

BÁRTOVÁ, Klára. Sexuální chování a preference v evolučním kontextu *[Sexual behavior and preferences in evolutionary perspective]*. Praha, 2020. 148 s. Disertační práce (Ph.D.). Univerzita Karlova, 1. lékařská fakulta. Vedoucí závěrečné práce Weiss, Petr.

Poděkování

Ráda bych na tomto místě poděkovala lidem, bez kterých by tato práce nikdy nemohla vzniknout:

Školiteli Petru Weissovi za pozitivní přístup a za to, že se mě ujal.

Káče za podnětné nápady, rady, podporu a za to, že jsem díky ní mohla začít dělat vědeckou práci.

Jarce, která pro mě bude vždycky akademickou maminkou. Podnítila a podpořila jsi můj zájem o výzkum sexuality a partnerských vztahů a za to ti budu vždy vděčná.

Zuzan za její přátelství a neuvěřitelnou podporu.

Rodině, která je mi velkou oporou, a já jsem jí za to moc vděčná.

Oliverovi, protože tu vždycky byl.

Lucce, Renče a všem svým dalším spoluautorům, protože bez nich by tahle práce nikdy nevznikla.

Participantům, že byli ochotní zúčastnit se níže uvedených studií.

Abstrakt

Předkládaná dizertační práce se skládá ze tří částí. První část se zaměřuje na představení recentních evolučních teorií a konceptů, které se váží k sexuálnímu chování a preferencím. Jedná se především o koncept sociosexuální orientace, o teorii pohlavních strategií a teorii strategického pluralismu, přičemž poslední zmiňované teorie vycházejí z Triversovy teorie o asymetrických rodičovských investicích. Druhá část práce přibližuje problematiku sexuálních preferencí a poruch sexuálního chování pohledem evoluční psychologie a popisuje výzkum jejich četnosti v České populaci. Skládá se z přehledového článku vydaného v knize Encyclopedia of Evolutionary Psychological Science a z odborného článku vydaného zahraničním impaktovaném časopise The Journal of Sex Research. Třetí část práce je tvořena třemi odbornými impaktovanými články, přičemž dva z nich momentálně prochází poslední fází recenzního řízením v zahraničních impaktovaných časopisech a jeden je vydán v časopise Personality and Individual Differences. Tato část práce si kladla za cíl jednak prozkoumat individuální rozdíly v sociosexuální orientaci jedinců v kontextu jejich femininity-maskulinity, osobnostních faktorů a míry individuální excitace a inhibice. Dále bylo prozkoumáno, zda u jedinců obou pohlaví dochází k pozornostnímu zkreslení vůči sexuálním podnětům a zda toto pozornostní zkreslení může ovlivňovat právě míra sociosexuality. Výsledky těchto studií ukazují, že přestože existuje značná variabilita v sociosexualitě a v sexuálních preferencích mezi pohlavími, interindividuální variabilita v rámci jednoho pohlaví může být větší. To, jakou sexuální strategii bude jedinec v konečném důsledku ve svém životě uplatňovat, závisí tedy nejen na jeho pohlaví, ale zejména i na individuálních charakteristikách a na sociokulturním prostředí, ve kterém se nachází a v němž se vyvíjí.

Klíčová slova: Evoluční psychologie; Párovací strategie; Sociosexualita; Parafilie

Abstract

The thesis is divided into three parts. The first part is focused on the main theories of human mating strategies, such as sociosexual orientation and sexual strategies theory, which emphasizes intersexual differences as a result from the asymmetry of parental investment, and strategic pluralism theory, which highlights intrasexual variation in mating behavior. The second part consists of one review article published in the Encyclopedia of Evolutionary Psychological Science and one original research article published in The Journal of Sex Research, a peer-reviewed journal. In this part we explored possible evolutionary origins and adaptive values of paraphilic interests and their prevalence in the Czech population. The third part consist of one article published in the peer-reviewed journal Personality and Individual Differences and two research studies which are currently under peer-review in two international journals. The main aim of this part was to test whether individual differences in femininity-masculinity, Big Five personality traits, and propensity to sexual excitation and inhibition are associated with individual sociosexual orientation. A further aim was to test whether attention towards sexual stimuli is affected by an individual´s level of sociosexual orientation and by depressive symptomatology. The results of these studies indicated high levels of variation in mating strategies, sexual behaviors and preferences, not only between but also within the sexes. Strategies which were actually employed depended not only on the sex but also on individual, environmental and cultural factors.

Keywords: Evolutionary psychology; Mating strategies; Sociosexuality; Paraphilias

Obsah

Seznam publikací

I. Klapilová K., & **Bártová K.** (2017). *Sexual Pathology*. In: Shackelford T., Weekes-Shackelford V. (eds) Encyclopedia of Evolutionary Psychological Science. Springer, Cham. DOI: 10.1007/978-3-319-16999-6_3382_1.

II. **Bártová, K.**, Androvičová, R., Krejčová, L., Weiss, P., & Klapilová, K. (2020). The prevalence of paraphilic interests in the Czech population: preference, arousal, the use of pornography, fantasy, and behavior. *The Journal of Sex Research*, 1-11. DOI: 10.1080/00224499.2019.1707468

III. **Bártová, K.**, Štěrbová, Z., Varella, M. A. C., & Valentova, J. V. (2020). Femininity in men and masculinity in women is positively related to sociosexuality. *Personality and Individual Differences*, *152*, 109575.

IV. Novák, O., **Bártová, K.**, Vagenknecht, V., & Klapilová, K. Attention Bias to and Recognition of Sexual Images. *Frontiers in Psychology - Health Psychology* (v recenzním řízení).

V. **Bártová, K.**, Novák, O., Weiss, P., & Klapilová, K. The personality traits and sociosexual orientation are related to the sexual inhibition and sexual excitation scales: evidence from the Czech Republic. *Personality and Individual Differences* (v recenzním řízení).

Úvod

Přestože existuje značné množství oborových hledisek, v rámci kterých by předkládaná práce mohla být zpracována, je ukotvena především v teoretickém rámci evoluční psychologie a sexuologie. Velké množství evolučně psychologické odborné literatury zaměřené na výzkum sexuálního chování a preferencí vychází především z konceptu pohlavních rozdílů a odlišných reprodukčních strategií mužů a žen.

Samotný text předkládané disertační práce je pomyslně členěn na tři části. Cílem úvodní kapitoly (a první části této práce) je představení recentních evolučních teorií a konceptů, které se váží k sexuálnímu chování a preferencím, neboť v následných odborných článcích na jejich detailnější analýzu není dostatečný prostor. Některá fakta, která se v této úvodní kapitole objeví, jsou zmíněna v úvodech či diskuzích níže přiložených studií. Vzhledem ke komplexitě popisovaných teorií jsme je ale považovali za důležité podrobněji rozebrat i v této úvodní části.

Další kapitoly se již věnují konkrétním aspektům, které mohou modifikovat sexuální chování a preference a to jak u heterosexuálních, tak u homosexuálních jedinců. Všechny přiložené studie se zaměřují na méně prozkoumané charakteristiky a teoretické koncepty, které ovšem mohou mít na sexuální chování a preference podstatný vliv. Druhá část disertační práce se zaměřuje na evoluční kořeny poruch sexuálních preferencí a chování (tzv. parafilií) a je tvořena kapitolami č. II a III. Kapitola II. „*Sexual Pathology*„ má za cíl vysvětlit, jak je evoluční optikou možné vysvětlit poruchy sexuálních preferencí a chování. Text vychází především z paradigmatu evoluční sexuologie a psychiatrie, což umožňuje nahlížet na poruchy sexuální preference jako na „sexuální variace“, tedy jako na adaptivní behaviorální strategie, pro které existují vrozené predispozice, jež přinášely naším předkům v evoluční historii lidského druhu reprodukční úspěch. Hlavní teoretická východiska oboru evoluční sexuologie jsou

v textu následně aplikovány na vybrané poruchy sexuálních preferencí (např. pedofilie, sexuální agrese či fetišismus). V kapitole III. „*The prevalence of paraphilic interests in the Czech population: preference, arousal, the use of pornography, fantasy, and behavior*“ popisujeme, jaká je prevalence poruch sexuálních preferencí u mužů a žen v České republice. Ve studii jsme se zaměřili na pět základních dimenzí sexuální zkušenosti u třinácti vybraných poruch sexuálních preferencí (konkrétně na voyeurismus, tušérismus/frotérisums, fetišismus, transvestitismus, exhibicionismus, sadismus, masochismus, autogynefílii, zoofilii, pedofilii, efebo a hebofílii, patologickou sexuální agresivitu a agresivní sadismus). Třetí část práce se zaměřuje na méně prozkoumané charakteristiky a teoretické koncepty, které mohou ovlivňovat sociosexualitu jedinců (tj. tendenci navazovat nezávazné sexuální vztahy; Penke & Asendorpf, 2008) a tím pádem mohou mít vliv na variabilitu v sexuálním chování jedinců. Kapitola IV. „*Femininity in men and masculinity in women is positively related to sociosexuality*“ se zaměřuje na vztah mezi genderovou non/konformitou v dětství a dospělosti (tj. femininitou-maskulinitou) a sociosexualitou u heterosexuálních a homosexuálních mužů a žen z Brazílie a České republiky. V kapitole V. „*Attention Bias to and Recognition of Sexual Images*“ je představen experiment, který měl za cíl testovat, zda u mužů a žen dochází k pozornostnímu zkreslení vůči sexuálním podnětům a zda je toto pozornostní zkreslení ovlivněno právě jedincovou sociosexualitou a mírou deprese. A konečně, kapitola VI. „*The personality traits and sociosexual orientation are related to the sexual inhibition and sexual excitation scales: evidence from the Czech Republic*„ se zaměřuje na vztah mezi mírou sexuální inhibice a sexuální excitace, osobnostními rysy a sociosexualitou u heterosexuálních a homosexuálních mužů a žen z České republiky.

Výzkumy uvedené v této práci přinášejí celou řadu důležitých poznatků jak pro vědeckou obec, tak i pro širší veřejnost. Všechny níže uvedené studie byly provedeny v souladu s obecnou etikou vědeckých výzkumů.

Kapitola I – Párovací a reprodukční strategie mužů a žen

Výsledky výzkumů, zaměřených na sexuální chování a preference, ukazují, že se jedná o oblast, ve které jsou konstantně nacházeny významné mezipohlavní rozdíly (např. Kennair, Grøntvedt, Bendixen, & Amundsen, 2017). Tyto pohlavní rozdíly je možné vysvětlit skrze několik základních evolučně-psychologických teorií, které se zabývají párovacími strategiemi, přičemž první z nich formuloval již Darwin (1859/2007) v rámci své teorie přirozeného a specificky zejména pohlavního výběru. Z pohledu evoluční psychologie párovací strategie ovlivňují jednak způsob výběru partnera a za druhé i míru úsilí, kterou jedinci do tohoto výběru a do následné výchovy potomků investují (Buss & Schmitt, 1993). Jedná se tedy o soubor evolučních adaptací, které se vyvinuly za účelem maximalizovat jedincovu reprodukční zdatnost (Bártová & Štěrbová, 2020). V následující kapitole budou tyto hlavní teorie a koncepty, které se párovacími strategiemi zabývají, a které vychází z evolučně-psychologické perspektivy, nastíněny. Jedná se o již zmiňovanou teorii přirozeného výběru (Darwin, 1859/2007), teorii asymetrických rodičovských investic (Trivers, 1972), teorii pohlavních strategií (Buss & Schmitt, 1993), teorii strategického pluralismu (Gangestad & Simpson, 2000) a koncept sociosexuální orientace (Simpson & Gangestad, 1991).

1.1. Přirozený výběr

Hlavní myšlenkou Darwinovy (1859/2007) teorie přirozeného výběru je, že jedinci mezi sebou v rámci daného druhu s kompetují o přežití a rozmnožení se. Přirozený výběr, který Darwin dále rozdělil na výběr přírodní a pohlavní, je tak určitým typem soutěže. Podle teorie přirozeného výběru se mezi sebou jedinci daného druhu v určitých vlastnostech, které jsou z větší části dědičné, liší. Tuto variabilitu nejčastěji způsobují

buď mutace, nebo různé vlivy prostředí, jako jsou například patogeny (Flegr, 2007). Jedinci, kteří disponují vlastnostmi, které je v této kompetici o přežití a rozmnožení se zvýhodňují, mají vyšší pravděpodobnost, že přežijí a v budoucnu po sobě zanechají větší množství potomků a tedy i svých genů. Jinými slovy, předáním většího množství svých genů do genofondu[1] následujících generací prostřednictví potomků si tak jedinci oproti ostatním zvyšují svou biologickou zdatnost[2]. Podle Flegra (2007, str. 41) mohou být předmětem biologické evoluce pouze „*...systémy, dostatečně komplexní, obsahují vzájemně si konkurující prvky schopné reprodukce, proměnlivosti a dědičnosti.“*. V průběhu času pak může dojít k systematickému posunu frekvencí výskytu alel v genofondu daného druhu. Skrze tento posun se daný druh může vyvíjet, protože jedinci v rámci něj získávají takové vlastnosti, které jim zajišťují větší šanci na přežití a rozmnožení se. Přirozený výběr proto hraje nezastupitelnou roli v evoluci, protože jeho působením vznikají adaptivní (účelné) vlastnosti. Tyto adaptivní vlastnosti mohou být nejen fyziologického a morfologického rázu, ale také psychického či behaviorálního (Flegr, 2007).

Přirozený výběr se dále dělí na výběr přírodní a pohlavní (Darwin, 1859/2007). V rámci přírodního výběru jsou jedinci selektování vnějším prostředím. Skrze přírodní výběr tedy vznikají adaptace spojené s úspěšným přežitím jedince. Druhým typem je výběr pohlavní, jehož působením jsou selektováni jedinci s větší sexuální zdatností, tedy jedinci, kteří disponují vlastnostmi a schopnostmi, které jim, oproti jejich konkurentům, umožňují získat sexuálního partnera a následně se rozmnožit (Flegr, 2007). Směr a intenzita pohlavního výběru může být velmi odlišná, což může mít za následek vznik sekundárních pohlavních znaků a rovněž výrazného pohlavního

[1] Genofond označuje soubor všech alel (tj. konkrétních forem genu) v dané populaci (Flegr, 2007).
[2] Biologická zdatnost, neboli fitness, se měří počtem alel daného jedince, které jsou předány do další generace. Dělí na exkluzivní fitness (tj. přímou, odvozenou od reprodukčního úspěchu jedince) a na inkluzivní fitness (nepřímou, do které se započítává jak vlastního reprodukčního úspěch jedince, tak reprodukční úspěch jeho příbuzných jedinců; Flegr, 2004).

dimorfismu (Flegr, 2007), přičemž tyto sekundární pohlavní znaky mohou zahrnovat nejen morfologické, ale rovněž i behaviorální struktury (Prakash & Monteiro, 2016*).*

Pohlavní výběr se může odehrávat buď na úrovni intrasexuální (vnitropohlavní), tak na úrovni intersexuální (mezipohlavní). Na úrovni vnitropohlavního výběru musí například samec kompetovat s jinými samci o přístup k plodným a geneticky kvalitním samicím. „*Proto právě samci mezi sebou bojují a vytrvale před samicemi předvádějí své půvaby a vítězové pak předávají své přednosti samčím potomkům*“ (Darwin 1871/2005, s. 33). Předávány jsou pak takové vlastnosti, které jedincům v této kompetici pomohly uspět a naopak vlastnosti, které jsou nevýhodné (neosvědčily se) budou do dalších generací předávány méně často (Darwin, 1871/2005). Typickým příkladem vnitropohlavní kompetice jsou souboje jelenů v říji. U člověka se určité formy vnitropohlavní kompetice vyskytují jak u žen, tak u mužů a mívají často podobu verbální agrese, pomluv či fyzické agresivity (Arnocky, 2016; Arnocky & Carré, 2016).

Podle Darwina (1871/2005, s. 402) ale „*existuje ještě další a mírumilovnější způsob soupeření, při kterém se samci pomocí různých půvabů snaží samice vzrušit a přilákat*“. Tento mírumilovnější způsob označuje Darwin jako mezipohlavní výběr, v rámci nějž si jedinci jednoho pohlaví (typicky samice) vybírají jedince opačného pohlaví (typicky samce). Tento preferenční výběr se uskutečňuje na základě takových vlastností jedince, které vybírající pohlaví považuje za žádoucí, protože mohou vést buď k většímu počtu případných potomků nebo odkazovat k jejich lepší biologické či sociální kvalitě. Tyto vlastnosti zahrnují znaky, které jedinci u druhého pohlaví považují za atraktivní. Mohou to být různé ornamenty a barevné zbarvení některých ptáků, ale také chemické signály, které užívá hmyz či někteří savci k nalákání potencionálních partnerů (Kennair a kol., 2017). U člověka se jedná například o pohlavně dimorfní znaky spojené s femininitou a maskulinitou jedince, jako je tvar obličeje, výška hlasu,

tvar postavy, dominance, či míra tělesného ochlupení (Dixson, 2016; Kordsmeyer, Hunt, Puts, Ostner, & Penke, 2018; Puts, 2016). Nicméně je třeba podotknout, že přestože se dlouhou dobu předpokládalo, že mezipohlavní výběr je hlavním mechanismem, který ovlivňoval vznik a vývoj sexuálně dimorfních znaků u člověka (Saxton, Mackey, McCarty, & Neave, 2016), novější výzkumy indikují, že vnitropohlavní kompetice v tomto může právě u lidí hrát mnohem významnější roli (Hill, Bailey, & Puts, 2017).

Podle evolučních psychologů tak skrze mezipohlavní výběr vznikly specifické adaptace (například varianty partnerských preferencí), které následně ovlivnily i lidské sexuální chování (Buss & Schmitt, 2016). Přestože se většina těchto adaptací nejvýznamněji formovala v období pleistocénu v tzv. prostředí evoluční adaptovanosti (tj. v období čtvrtohor, cca 2,58 milionu let – 10.000 let př. n. l.; Alcock, 2009), tak je řada těchto adaptací přítomna v lidské psychice dodnes. Tyto adaptace tedy mohly přinášet reprodukční výhodu v prostředí lovecko-sběračských společností, ale nemusí již být tolik výhodné v prostředí současném (Lehmiller, 2017).

1.2 Triversova teorie asymetrických rodičovských investic

Mezipohlavní výběr bývá často označován jako tzv. samičí výběr. Toto označení indikuje, že samice bývají většinou to pohlaví, které je více vybíravé. Vysvětlení, proč tomu tak je, nastínil v roce 1948 britský vědec A. J. Bateman. Během svého experimentu na octomilkách (*Drosophila melanogaster*) si všiml toho, že u samců existuje mnohem větší rozdíl v počtu potomků než u samic. Ukázalo se, že někteří samečci měli mnohem větší počet potomků, než většina samiček a jiní samečci se naopak nerozmnožili vůbec. Samotné samice se mezi sebou v počtu potomků (a tedy ve fitness) lišily mnohem méně. Tento rozdíl mezi rozptylem celoživotního úspěchu mezi

samci a samicemi je totiž způsoben existencí anizogamie[3]. Samice většiny živočišných druhů jsou na rozdíl od samců biologicky limitovány rychlostí tvorby energeticky nákladných a velkých pohlavních buněk – vajíček. Samci sice disponují velkým množstvím malých a na výrobu nenákladných energetických pohlavních buněk – spermií, ale jsou rovněž limitováni počtem samičích pohlavních buněk, které mohou oplodnit. Jinými slovy, přestože je průměrný celoživotní reprodukční úspěch obou pohlaví shodný, rozptyl celoživotního reprodukčního úspěchu se může mezi pohlavími lišit. Pokud rozptyl celoživotního reprodukčního úspěchu u jednoho pohlaví převýší rozptyl druhého pohlaví, tak se toto pohlaví s menším rozptylem spíše stane vybíravějším. Toto zjištění, které se ukázalo jako platné i u jiných druhů, než je octomilka, následně vešlo ve známost jako Batemanův princip.

Popsaný Batemanův princip úzce souvisí s Triversovou (1972) teorií rodičovských investic. Robert L. Trivers ve své teorii detailněji rozvedl a popsal vztah mezi rodičovskými investicemi a sexuálními strategiemi samců a samic. Podle Triverse (1972, str. 139) jsou rodičovské investice „*jakákoliv investice rodiče do určitého potomka, která zvyšuje šanci tohoto potomka na přežití (a tudíž i na rozmnožení se) na úkor schopnosti rodiče investovat do jiného potomka*“ a pohlaví, které má tyto investice větší, bude také vybíravější. Tato asymetrie v minimálních rodičovských investicích se dá pozorovat u většiny druhů, především pak u savců, kde až na pár výjimek bývají tím více investujícím pohlavím právě samice. Méně typická asymetrie, kde jsou více investujícím pohlavím samci, byla dobře popsána například u některých druhů čeledi Jehlovitých (*Syngnathidae*). Samice u těchto druhů bývají rovněž větší, agresivnější, barevnější a kompetují s jinými samicemi o přístup k samcům. U těchto druhů jsou pak

[3] Jde o typ pohlavního rozmnožování, kdy v rámci jednoho druhu dochází ke splynutí dvou pohlavních buněk odlišné velikosti a vlastností. Menší gamety bývají typicky samčí a větší pak samičí (Parker, 1972).

tím vybíravějším pohlavím samci, což se projevuje tím, že inkubují a vychovávají potomky jen určitých jimi vybraných samic. Z uvedeného je tedy patrné, že konkrétní reprodukční strategie jedinců jsou odvozovány právě od investičních strategií a nikoli od pohlaví jako takového (Trivers, 1985).

Jak bylo popsáno výše, tak se tato asymetrie v investicích projevuje již na úrovni gamet. U člověka žena za celý život disponuje cca 300-500 vajíčky, které je možné oplodnit, kdežto muž za celý život vyprodukuje obrovské množství spermií (Macklon & Fauser, 1999). U většiny samců (a tedy i u člověka) mají minimální rodičovské investice podobu pouhého pohlavního styku. Minimální rodičovské investice samic bývají ale větší, protože kromě samotného pohlavního styku zahrnují i těhotenství, porod, laktaci a následnou péči o dítě (Trivers, 1972). Pro člověka je ovšem typické, že muži do potomků neinvestují jen zmíněné minimální rodičovské investice (tj. ve formě sexuálního styku), ale podílejí se i na následné péči o potomka. Protože nemohou do dítěte investovat přímo (například ho kojit), tak často investují nepřímým způsobem, například poskytováním různých zdrojů, jako jsou finance, čas, či ochrana potomka i matky. Otcovská péče je navíc především u člověka klíčová, protože na rozdíl od jiných mláďat je lidské mládě ještě poměrně dlouhou dobu po porodu plně závislé na rodičovské péči a tato postnatální péče znatelně zvyšuje šanci potomka na přežití (Bjorklund & Shackleford, 1999). Péče o potomka od obou rodičů je u tedy člověka velmi rozšířeným fenoménem, ale je nutno podotknout, že její míra a podoba není univerzální a variuje napříč kulturami a i historickým obdobím (Low, 2000, cit. podle Kennair a kol., 2016).

Výše popsaná asymetrie ve velikosti pohlavních buněk a v minimálních rodičovských investicích následně vede i k odlišným reprodukčním strategiím. Samicím, které tedy většinou investují více, se proto vyplatí zaměřit se na co

nejkvalitnějšího samce. Jsou tedy vybíravějším pohlavím, které se orientuje spíše na kvalitu potomstva. Samcům se naopak kvůli nižším minimálním rodičovským investicím více vyplatí investovat do kvantity než do kvality. Vhodnou reprodukční strategií pro ně proto bývá oplodnění co největšího počtu samic (Bateman, 1948). Jinými slovy, aby samci mohli maximalizovat svůj reprodukční úspěch, tak by se měli orientovat na větší počet sexuálních partnerek, které mohou oplodnit, nebo preferovat plodnější samice. Samice by měly naopak kvůli omezenému počtu potomků, které mohou zplodit, preferovat buď samce, kteří se budou podílet na dalších investicích a na výchově potomka, nebo preferovat samce, kteří jsou geneticky kvalitní (Trivers, 1972). U obou pohlaví tedy můžeme rozlišovat mezi *krátkodobou a dlouhodobou párovací strategií*. To, jakou strategii si daný jedinec „zvolí“, potom ovlivňuje právě míra rodičovských investic, kterou může uplatnit. Obě tyto strategie nejsou jedinci samozřejmě vybírány vědomě a jedná se tedy o nevědomé procesy a volbu. Od míry rodičovských investic se dále odvíjí i pohlavní rozdíly mezi muži a ženami v oblasti sexuálního chování (Buss & Schmit, 1993; Buss & Schmit, 2016; Trivers, 1972). Pokud muži „zvolí“ krátkodobou strategii, tak se řídí spíše dostupností dané ženy a minimalizují své rodičovské investice, při dlouhodobé strategii si muži vybírají partnerky spíše na základě indikátorů jejich plodnosti, tj. na základě znaků, které odráží například zdraví a atraktivitu dané ženy (tj. znaky mládí či femininity, podrobněji viz následující podkapitola; Buss & Schmitt, 1993). Ženy, které „volí“ krátkodobou párovací strategii se u svých potencionálních partnerů zaměřují rovněž na znaky, které odráží například zdraví a atraktivitu daného muže (tj. znaky poukazující na zdraví či maskulinintu) a v případě dlouhodobé párovací strategie volí spíše partnery, kteří disponují vlastnostmi (např. vyšší socioekonomický status, dominanci, inteligenci),

které odkazují k lepší schopnosti zabezpečit nejen ženu samotnou, ale i její případné potomky (Buss & Schmitt, 1993).

Triversova teorie asymetrických rodičovských investic je tak jednou z klíčových proměnných, která má vliv na pohlavní výběr. Skrze tuto teorii lze vysvětlit velkou variabilitu mezi ženami a muži ve fyzických, behaviorálních a psychických charakteristikách, jako například zmiňovaný pohlavní dimorfismus, ale i takové komplexní formy chování jako je sexuální a emoční žárlivost, nevěrné chování, či pohlavní rozdíly v sociosexualitě (viz dále).

2.2 Teorie pohlavních strategií

Triversovu teorii asymetrických investic (a z ní popsané vyplývající pohlavní rozdíly) v roce 1993 podrobněji rozpracovali evoluční psychologové Buss a Schmitt ve své *teorii pohlavních strategií* (*Sexual Strategies Theory*). Podle nich se u lidí v průběhu evoluce vyvinuly komplexní párovací strategie. Některé z těchto strategií mají muži a ženy podobné, jiné se mezi pohlavím výrazně liší právě proto, že muži a ženy v průběhu lidské evoluce čelili rozdílným selekčním tlakům a odlišným adaptivním problémům spojených s reprodukcí.

Teorie pohlavních strategií pracuje jednak s biologickým pohlavím jedince (muž/žena) a dále s délkou trvání daného partnerského vztahu (od krátkodobých náhodných sexuálních setkání až po dlouhodobý vztah). V předchozí podkapitole bylo nastíněno, že se muži a ženy liší svými minimálními rodičovskými investicemi. Kromě výše zmíněných minimálních investic (těhotenství, porod, laktace na straně žen vs. pohlavní styk na straně mužů) existují i další klíčové pohlavní rozdíly spojené především s plodností. Plodnost žen je cyklická, zatímco plodnost mužů není; plodnost žen je striktně věkově omezena, zatímco plodnost mužů věkem sice klesá, ale není

omezena jako u žen. Tyto rozdíly pak měly za následek to, že se v průběhu lidské evoluce ženy a muži těmto pohlavním rozdílům v reprodukční biologii psychologicky a i strategicky přizpůsobili (Buss & Schmitt, 1993; 2016; 2019).

Co se týče délky vztahu, u člověka se objevuje *dlouhodobá párovací strategie*, která se je typická dlouhými námluvami, trvalými párovými svazky, pair-bondingem mezi partnery, závazkem vůči partnerovi/ce a společnou rodičovskou péčí o potomka. Přestože je vznik dlouhodobých partnerských dvojic pro člověka typickým znakem, u dalších savců je vytváření stabilních partnerských dvojic ojedinělou strategií. Ukazuje se, že zatímco například u ptáků je vytváření stabilních partnerských dvojic poměrně běžné (až 90 % ptáků vyváří stabilní páry), pouhé 3 – 5 % savců vytváří partnerské dvojice za účelem výchovy mláďat. U ptáků a savců (člověka nevyjímaje), jejichž primární reprodukční strategií je monogamie, se rovněž vyskytují určité specifické vzorce chování, jako je společná ochrana teritoria, společné stavění hnízd, vzájemné krmení a grooming, dělení se o rodičovské povinnosti apod. (Buss & Schmitt, 1993; 2016). U člověka můžeme nalézt ale i *krátkodobou párovací strategii*, která má často podobu jednorázového sexuálního kontaktu či nezávazného vztahu (Scelza, 2011). Adaptivní problémy, které museli muži a ženy opakovaně řešit, se tedy lišily i v závislosti na této důležité časové dimenzi (trvání délky vztahu). Biologické pohlaví a délka vztahu tak vytvářejí matici dvou adaptivních problémů, tak jak je uvedeno v tabulce č. 1 (Buss & Schmitt, 2016, str. 3)

Sexual Strategies Theory, Table 1 Mate selection problems men and women confront in short-term and long-term mating contexts

Mating type	Men	Women
Short-term	Increasing partner number	Immediate resources
	Identifying sexually accessible women	Evaluating ST as LT mates
	Minimizing cost and risk	Identifying good genes
	Minimizing commitment	Mate insurance, backup mates
	Identifying fertile women	Mate switching
Long-term	Paternity probability	Men able to invest
	Female reproductive value	Men willing to invest
	Commitment	Commitment
	Good parenting abilities	Good parenting abilities
	Gene quality	Gene quality
	Relationship load	Relationship load
	Longevity probability	Physical protection

Table is adapted from Table 1 of Buss and Schmitt (1993), p. 207

Z výše uvedené Triversovy teorie asymetrických rodičovských investic (Trivers, 1972) je tedy patrné, že krátkodobým párovacím strategiím by měli být více nakloněni muži, protože si (na rozdíl od žen) mohou zvýšit reprodukční úspěch skrze vyšší počet pohlavních styků s mnoha ženami, než mít děti pouze s jednou partnerkou. Tato hypotéza byla podpořena velkým množstvím předchozích studií. Petersen a Hyde (2010) ve své metaanalýze zaměřené na sexuální chování a postoje zjistili, že muži mají oproti ženám pozitivnější přístup k sexu, jsou i více liberálnější co se týče sexuálního chování a častěji se dopouští sexuální nevěry. Tyto pohlavní rozdíly se navíc ukázaly jako kulturně univerzální (Lippa, 2009). Ve své rozsáhlé studii, zahrnující 52 národů na šesti kontinentech a 13 ostrovech, Schmitt (2003) ukázal, že muži vykazují ve srovnání se ženami v průměru například větší motivaci pro krátkodobé a nezávazné sexuální vztahy, udávají, že touží po větším množství sexuálních partnerů, vykazují větší postojovou otevřenost vůči sexu bez závazku a praktikují větší množství sexuálních aktivit. Pohlavní rozdíly v četnosti můžeme nalézt i v míře konzumace pornografie a prostituce (např. Hald, 2006; Jæger a kol., 2000) nebo v ochotě mít sex s neznámým

člověkem a to bez ohledu na jeho fyzickou atraktivitu (např. Guéguen, 2011; Hald & Høgh-Olesen, 2010; Schützwohl, Fuchs, McKibbin, & Shackelford, 2009), což nepřímo podporuje tvrzení, že v rámci krátkodobé párovací strategie jsou muži orientování spíše na kvantitu než na kvalitu potencionálních partnerek.

Pro ženy by naopak kvůli vysokým investicím na rozmnožení se měla být výhodnější dlouhodobá párovací strategie, protože pokud by žena navazovala krátkodobé vztahy, tak se vystavuje riziku, že veškeré rodičovské investice a náklady na potomka i na jeho následnou péči ponese sama (Buss & Schmitt, 1993). Proto ženy, které „volí“ dlouhodobou párovací strategii, upřednostňují muže, kteří mají přístup ke zdrojům a jsou ochotni své zdroje do ní a do případného potomka investovat. Tuto hypotézu opět podporuje velké množství výzkumů, které poukazují na její mezikulturní univerzalitu. Ženy kladou v průměru ve srovnání s muži větší důraz na partnerovy zdroje a na takové vlastnosti, které odkazují ke schopnosti mužů tyto zdroje získat. Jedná se například o sociální postavení, ambice a pracovitost, sociální dominanci, inteligenci apod. (např. Buss, 1989; Lippa, 2007; Zentner & Mitura, 2012). Guéguen a Lamy (2012) se ve svém experimentu zaměřili na to, jestli bude ženina ochota poskytnout neznámému muži své telefonní číslo ovlivněna jeho zdánlivým společenským postavením. Ukázalo se, že 23 % žen bylo ochotných poskytnout neznámému muži své telefonní číslo, pokud dotyčný muž řídil drahé sportovní auto. Pokud ale ten stejný muž řídil auto střední třídy, ochota žen klesla na 13 % a v případě, že řídil staré auto, tak na pouhých 8 %. Předchozí výzkumy dále ukazují, že ženy u dlouhodobých partnerů nepreferují znaky spojené s vyšší mírou maskulinity v kraniofaciálním komplexu (oblast lebeční báze, lebeční klenba a obličej). Jedná se typicky o výrazné nadočnicové oblouky, širší čelist, malé oči a více robustní střed obličeje. Tyto znaky jsou totiž u mužů spojovány s nižší přívětivostí, starostlivostí,

menší ochotou investovat do potomků a nižší ochotou navazovat dlouhodobé partnerské vztahy (pro přehled např. Dixson a kol., 2016). V evoluční historii musely ženy rovněž čelit problému ochrany, a proto se u nich vyvinuly preference pro muže, kteří byli schopni ji i jejího potomka ochránit před predátory a ostatními muži. V tomto případě se jedná o takové vlastnosti, které odkazují k fyzické zdatnosti a schopnosti ženu ochránit, jako je například výška a atletická zdatnost muže (Buss, 2016; Stulp, Buunk, & Pollet, 2013).

Krátkodobé párovací strategie by pro ženy podle této teorie měly být spíše nástrojem pro získání co nejlepšího dlouhodobého partnera. Kromě zmíněného risku, že ponese veškeré rodičovské investice sama, se totiž žena vystavuje i riziku promiskuitní reputace, čímž si může ztížit budoucí výběr dlouhodobého partnera, neboť promiskuitní ženy jsou, kvůli mužské nejistotě otcovství, považovány za nežádoucí dlouhodobé partnerky (Busche, Marks, & Oates, 2013). Skrze krátkodobou párovací strategii může žena například otestovat, zda je muž ochotný do ní a do případného budoucího potomka investovat, zjistit, jaké jsou jeho vlastnosti, odhadnout svou vlastní mate value[4] či vyměnit dosavadního partnera za vhodnějšího (Buss & Schmitt, 1993; 2016; Buss a kol., 2017). Výše uvedená tvrzení byla opět podpořena řadou studií. Ukazuje se, že v rámci krátkodobého vztahu ženy například upřednostňují atraktivní muže s více maskulinními a se symetrickými rysy v obličeji, což jsou obecně indikátory kvalitních genů (např. Gangestad & Simpson, 2000; Gildersleeve, Haselton, & Fales, 2014; Johnston, 2006; Kenrick, Sadalla, Groth, & Trost, 1990). Například Castro a de Araújo Lopes (2011) ve své studii poprosili ženy, aby ohodnotily jak moc je pro ně důležitá v rámci krátkodobého a dlouhodobého vztahu hezká tvář a hezké tělo partnera. Výsledky ukázaly, že na pětibodové škále ženy ohodnotily důležitost hezké tváře na

[4] Neboli pomyslná hodnota jedince na partnerském trhu (Fisher, Cox, Bennett, & Gavric, 2008).

3,42 bodu u krátkodobého vztahu oproti 2,17 u dlouhodobého vztahu a důležitost hezkého těla na 3,08 bodů oproti 1,83 u dlouhodobého vztahu. Některé studie zaměřené na výzkum reálného sexuálního chování ukazují, že si pro jednorázové vztahy ženy vybírají spíše symetrické muže (Gangestad, Thornhill, & Garver-Apgar, 2005) a že s fyzicky atraktivními protějšky dosahují častěji a pravidelněji orgasmu (Puts, Welling, Burriss, & Dawood, 2012). Pokud je muž fyzicky atraktivní, tak jsou ženy rovněž svolnější ke krátkodobému sexuálnímu vztahu a to i přesto, že se může jednat o jedince, kterého daná žena nezná (Guéguen, 2011; Hald & Høgh-Olesen, 2010; Schützwohl a kol., 2009). Některé studie navíc naznačují, že tyto preference pro atraktivní protějšek fluktuují v průběhu menstruačního cyklu žen a pomyslného vrcholu dosahují v období ovulace ženy (tj. v období největší pravděpodobnosti početí by ženy podle evoluční logiky měly klást největší důraz právě na atraktivitu svého protějšku; Thornhill & Gangestad, 2008), což podporuje zmíněnou teorii, že krátkodobá párovací strategie může být pro ženy výhodná především z hlediska nalezení partnera s kvalitními geny. Další studie poukazují na to, že pro ženy může být výhodná krátkodobá strategie i v době, kdy skrze ni může žena od muže získat okamžité zdroje. Toto tvrzení výzkumně podpořil i Buunk a kolektiv (2001), kteří zjistili, že schopnost obstarat zdroje úzce souvisí s věkem daného jedince. V jeho studii se ukázalo, že ženy v rámci krátkodobých vztahů preferovaly partnery, kteří byli přibližně o 4 roky starší než ony samy a muži preferovali zase partnerky, které byly přibližně o jeden rok mladší. Toto spojení krátkodobé párovací strategie výměnou za zdroje podporují i studie, které se zaměřily na důvody prostituce u žen (Hald, 2006; Jæger a kol., 2000).

Pro muže může být hlavní výhodou dlouhodobé párovací strategie monopolizace celoživotního reprodukčního potenciálu partnerky, a do určité míry i zmírnění problému nejistoty otcovství a s tím spojeným rizikem výchovy cizího dítěte. Rovněž mohou

profitovat ze zdrojů partnerky a i její rodiny (Buss & Schmitt, 1993). Pro muže je proto v kontextu dlouhodobé párovací strategie klíčové navázat vztah se ženou, která má vysokou reprodukční hodnotu. V rámci krátkodobých vztahů by tedy muži měli preferovat spíše ženy s vysokou plodností (tj. pravděpodobností okamžitého početí), kdežto u dlouhodobých vztahů by měli klást důraz spíše na reprodukční hodnotu ženy, která zahrnuje všechna možná budoucí početí. Protože je ale ovulace u člověka relativně skrytá a muži nemohou detekovat plodnost partnerky přímo (např. Roberts a kol., 2004), Buss a Schmitt (1993) proto předpokládají, že muži upřednostňují u žen takové vlastnosti a znaky, které korelují právě s jejich plodností a reprodukční hodnotou. Vzhledem k tomu, že plodnost žen je výrazně omezena věkem, považují muži za atraktivní fyzické znaky spojené s femininitou, zdravím a mládím, tedy znaky, které odkazují právě na ženinu plodnost. Muži oproti ženám v průměru u dlouhodobých partnerek kladou větší důraz na znaky, které odkazují na relativní mládí partnerky, jako jsou například neotenní znaky v obličeji, plné rty, čistou a zdravě vypadající pokožku, velké a široké oči, malou bradu, dlouhé a lesklé vlasy a pevná prsa (Buss, 1989; Buss & Schmitt 1993; Kenrick & Keefe 1992; Sugiyama, 2005). Dále na znaky indikující vysokou hladinu estrogenu, jako jsou femininní znaky ve tváři, femininní hlas, poměr pasu a boků okolo 0,7[5] (tzv. *waist-to-hip-ratio*, WHR) a znaky spojené se zdravím, jako je nízká míra fluktuační asymetrie[6] (Buss & Schmitt 1993). Je ovšem nutné zmínit, že tato zjištění jsou sice do velké míry pankulturně univerzální (např. Buss, 1989; Lippa, 2007; Zentner & Mitura, 2012), ale některé výše uvedené znaky (např. zmiňovaná

[5] Jde o poměr obvodu pasu a boků, který je ukazatelem rozložení tuku v těle. Podle poměru můžeme rozlišit WHR na mužský (tzv. androidní, centrální) a na ženský (gynoidní, periferní) typ. U mužského typu se tuk ukládá v břišní krajině, u ženského typu se tuk se ukládá v oblasti stehen a hýždí. WHR je indikátorem zdraví a také ukazatelem atraktivity. Typické rozmezí u žen se pohybuje mezi 0,67-0,80 a u mužů mezi 0,85 - 0,95 (Buss & Schmitt 1993).

[6] Jedná se o drobné odchylky od dokonalé bilaterální symetrie. Vznikají v díky vadné expresi genů v průběhu ontogenetického vývoje jedince, tedy během tzv. vývojové nestability, působením patogenů, případně kombinací obojího (Havlíček & Rubešová, 2009).

hodnota WHR) se mohou mírně lišit nejen mezi kulturami, ale i v rámci dané kultury (pro přehled např. Brooks a kol., 2015). Dále se ukazuje, že jak muži a ženy stárnou, tak se tyto rozdílné preference pro dlouhodobé partnery stávají v některých charakteristikách intenzivnější. Kenrick a Keefe (1992) například zjistili, že muži ve věku 25 let preferovali partnerky v průměru o čtyři roky mladší, než byli oni sami a ženy ve stejném věku naopak preferovaly muže o čtyři roky starší. Ve věku 65 let muži ale preferovali ženy, které byly o deset až patnáct let mladší, kdežto ženy preferovaly muže, kteří byli ve věku 65 – 75 let. Zdá se, že muži tedy preferují jako dlouhodobé partnerky spíše ženy, které jsou na vrcholu své fertility (tj. okolo 20 roku života). Toto zjištění dokresluje i další výzkum Kenricka a kolektivu (1996), kteří zjistili, že teenageři naopak preferují partnerky, které jsou o něco málo starší než oni sami.

Díky tomu, že u člověka dochází k vnitřnímu oplození a díky fenoménu skryté ovulace, museli muži rovněž čelit problému nejistoty otcovství. Z tohoto důvodu podle Busse a Schmitta (1993) muži kladou u dlouhodobých partnerek důraz jednak na ženinu sexuální věrnost (což snižuje jejich nejistotu otcovství) a rovněž preferují ženy s dobrými rodičovskými schopnostmi a kompatibilními osobnostními charakteristikami. Ukazuje se, že ženy, které mají nižší hladinu testosteronu (Barrett a kol., 2013) a vyšší hladinu estrogenu (Smith a kol., 2012), bývají nejen femininější, ale mají i rysy spojované s vyšší plodností, jako je touha po větším počtu dětí. Kromě toho, že jsou femininní ženy hodnoceny jako atraktivnější, jsou zároveň považovány za přívětivější, důvěryhodnější a ochotnější spolupracovat (Grammer, Fink, Møller, & Thornhill, 2003).

Obecně tedy platí, že podle teorie pohlavních strategií mají muži i ženy v repertoáru jak krátkodobé, tak dlouhodobé párovací strategie. V kontextu párování u člověka se proto často používá termín smíšené párovací strategie. Tato teorie se tedy

zaměřuje spíše na pohlavní rozdíly v párovacích strategiích, tj. na rozdíly mezi muži a ženami. To, kterou strategii jedinec zvolí, je potom závislé na mnoha proměnných a faktorech, jako např. jedincova mate value, poměr pohlaví (relativní poměr mužů a žen) v dané populaci, vliv rodičů na výběr partnera či kulturní zvyklosti (např. Buss & Shackelford, 2008; Schmitt, 2016). Tyto krátkodobé a dlouhodobé strategie jsou ale ovlivněny i intraindividuální variabilitou a environmentálními podmínkami, což jsou faktory, které autoři této práce spíše opomíjí, přestože mají v párovacích strategiích obrovský na nezpochybnitelný význam (Bártová & Štěrbová, 2020).

2.3 Teorie strategického pluralismu

V roce 2000 Gangestad a Simpson postulovali *teorii strategického pluralismu* (tzv. *Strategic Pluralism Theory, SPT*). Předchozí studie ukazují, že pohlavní rozdíly v párování jsou u člověka ve skutečnosti větší v rámci jednoho pohlaví než mezi pohlavími (např. Gangestad & Simpson, 1990). Tato teorie na rozdíl od teorie pohlavních strategií proto klade větší důraz na rozdíly v párovacích strategiích v rámci jednoho pohlaví spíše než mezi nimi. Podle autorů navíc nelze jednoznačně určit, zda je hlavní párovací strategií mužů krátkodobá strategie a žen zase dlouhodobá (Bártová & Štěrbová, 2020). Během lidské evoluční historie totiž podle autorů museli muži i ženy při výběru partnera v závislosti na okolních podmínkách činit různé „kompromisy“ (tzv. *trade-off*). Na základě analýzy zisků a ztrát (tzv. *cost-benefit analýzy*; Parker & Smith, 1990) proto jedinci „zvažují[7]“ zda se jim vyplatí volit krátkodobou či dlouhodobou strategii podle toho, jak je daná strategie výhodná za určitých okolních podmínek.

V rámci výběru partnera by ženy, podle této teorie, měly v závislosti na okolních podmínkách dělat kompromis mezi genetickou kvalitou muže (tzv. *good genes*) a mezi

[7] Stejně jako u teorie pohlavních strategií si jedinci konkrétní strategie nevolí na vědomé úrovni. Jedná se tedy o nevědomé procesy.

jeho schopností zaopatřit ji a jejího budoucího potomka (tzv. *good provider*). Podle Gangestada a Simpsona (2000) ale jen velmi malé množství mužů disponuje jak dobrými geny, tak dobrou schopností zaopatřit budoucí rodinu. V populaci je jedinců, kteří obě tyto podmínky splňují, malé množství a je o ně jako o partnery mezi ženami velký zájem. To významně zvyšuje riziko, že bude mít daná žena při výběru takového partnera větší konkurenci, a že se jí jiné ženy mohou takového partnera snažit „přebrat". Výsledek tohoto kompromisu mezi *good genes* a *good privederem* ovlivňují následující podmínky: 1) charakteristiky a vlastnosti dané ženy, jako je například její věk, fyzická atraktivita, mate value nebo její zdraví; 2) faktory v okolním prostředí, jako je například ne/dostatek zdrojů či výskyt patogenů; 3) ženin přístup k možným zdrojům, protože ženy, které mají dostatek zdrojů (ať vlastních nebo od rodiny), nemusí být tolik závislé na zdrojích svého případného partnera.

Pokud má tedy žena dostatečné množství zdrojů a nalezne vhodného partnera s kvalitními geny, může pro ni být výhodnější krátkodobá párovací strategie a dobré geny svých budoucích potomků v rámci kompromisu upřednostní před případnými partnerovými rodičovskými investicemi a schopnostmi. Krátkodobá párovací strategie může být pro ženu výhodná i v prostředí s vyšším výskytem patogenů, které způsobují smrtelné nemoci a zvyšují tím i kojeneckou úmrtnost. Naopak dlouhodobá strategie se ženě vyplatí v takovém prostředí, ve kterém je třeba intenzivní rodičovské péče o potomka (Gangestad & Simpson, 2000). Velká variabilita prostředí, ve kterém se ženy v prostředí evoluční adaptovanosti nacházely, vedla jednak k rozvoji různých párovacích strategií, které se u člověka objevují dodnes, a rovněž i k výše popisované flexibilitě párovacího chování.

Od daných strategií a větší vybíravosti žen je podle autorů odvislá i krátkodobá a dlouhodobá párovací strategie mužů. Krátkodobé párovací strategie jsou výhodné

především pro muže, kteří vykazují známky genetické kvality, jako je například nízká míra fluktuační asymetrie. Meta-analýza, kterou provedli v roce 1998 Møller a Thornhill totiž ukázala, že nižší míra fluktuační asymetrie, která je i částečně dědičná, koreluje s vyšším reprodukčním úspěchem daného jedince. Kromě fluktuační asymetrie existují samozřejmě i další charakteristiky, které odkazují k mužovým dobrým genům (tj. ke genetické kvalitě). Jsou jimi například výše zmiňovaná maskulinita v kraniofaciální oblasti či dominantní chování (Durante, Eastwick, Finkel, Gangestad, & Simpson, 2016; Gangestad & Simpson, 2000). Pro většinu mužů může ale krátkodobá párovací strategie znamenat nulový reprodukční úspěch, protože nesplňují požadavky žen na krátkodobé partnery. Malý počet mužů tedy sice může dosáhnout skrze krátkodobou strategii vyššího reprodukčního úspěchu, ale pro většinu mužů je výhodnější dlouhodobá párovací strategie, protože skrze ni dosáhnou alespoň nějakého reprodukčního úspěchu (namísto nulového). U mužů se na základě výše nastíněných teorií (Triversovy teorie asymetrických investic a teorie pohlavních strategií) mohla sice jako preferovaná strategie vyvinout krátkodobá, ale pro většinu mužů výhodná není. Kompromisy, které muži podle teorie strategického pluralismu dělají, jsou proto mezi hledáním nových sexuálních partnerek a rodičovskými investicemi do potomků (Gangestad & Simpson, 2000).

Obě pohlaví podle této teorie dělají kompromisy mezi pářením a rodičovskými investicemi. Podle autorů mají muži i ženy ve svém „repertoáru“ oba typy strategií, případně uplatňují strategii smíšenou. Konkrétní strategie jedinci mění či kombinují v závislosti na tom, co je pro ně vzhledem k daným okolnostem a podle okolního prostředí nejvýhodnější (Durante a kol. 2016; Gangestad & Simpson, 2000). Je ale nutné podotknout, že přestože do určité míry teorie strategického pluralismu vysvětluje variabilitu v párování v rámci jednoho pohlaví, nevysvětluje, obdobně jako

teorie pohlavních strategií, jak další důležité proměnné, jako je například percepce vlastní mate value či sociosexuální orientace, ovlivňují výběr partnera a rovněž jak napomáhají udržovat romantické vztahy.

1.4 Sociosexuální orientace

Termín sociosexuální orientace (či sociosexualita) použili prvně koncem čtyřicátých let minulého století Alfred Kinsey a jeho kolegové. Ve svých studiích o sexuálním chování mužů a žen popisovali mezi respondenty rozdílnou sexuální toleranci a promiskuitu, kterou označili termínem sociosexualita. Jejich výzkumy ukázaly, že se od sebe lidé signifikantně liší nejen v sexuálním chování, ale i v postojích vůči nezávaznému sexu (Kinsey, Pomeroy, & Martin, 1948; Kinsey, Pomeroy, Martin, & Gebhard, 1953). V dnešním pojetí termín sociosexuální orientace odkazuje k „*individuálním rozdílům v tendenci navazovat nezávazné sexuální vztahy*“ (Penke & Asendorpf, 2008, s. 1113). Sociosexuální orientace je chápána jako metodologický konstrukt, který vychází především z výše popsané teorie strategického pluralismu, a který klade důraz především na intraindividuální variabilitu párovacího chování. Sociosexualita je tak z hlediska výzkumu sexuálního chování v evoluční perspektivě považována za jeden z nejrelevantnějších a nejdůležitější ukazatelů individuálních rozdílů v sexualitě (Kennair a kol., 2017).

Sociosexualitu „proslavili“ v roce 1991 Simpson a Gangestad, kteří vytvořili původní sedmi-bodový dotazník, který byl zaměřen právě na měření sociosexuality (tzv. *Sociosexual Orientace Inventory; SOI*). Bipolární škála sociosexuality přecházela z restriktivní (*resticted sociosexuality*) po nerestriktivní sociosexualitu (*unresticted sociosexuality*). Restriktivní jedinec má podle autorů tendenci mít sex pouze s osobami, které jsou mu citově blízké a udržuje s nimi romantický vztah a nerestriktivní má

naopak tendence ke krátkodobým sexuálním vztahům, které jsou typické nízkým závazkem a nízkými investicemi do vztahu. Zjednodušeně řečeno, restriktivní sociosexualita je spojována s dlouhodobými párovacími strategiemi a nerestriktivní sociosexualita zase s krátkodobými párovacími strategiemi. Jedinci s vyšší mírou nerestriktivní sociosexuality navazují spíše krátkodobé vztahy a to i s několika partnery naráz, mívají větší počet sexuálních partnerů, a v rámci sexu pro ně není emoční zainteresovanost či láska tolik důležitá, jako pro jedince s restriktivnější sociosexualitou. Ti totiž často udávají, že závazek vůči partnerovi/partnerce či emoční blízkost (láska) je pro ně v rámci sexuálních aktivity stěžejní a proto se i vyhýbají jednorázovým sexuálním vztahům (Simpson & Gangestad, 1991).

Po značné kritice byl ale původní model sociosexuální orientace (Simpson & Gangestad, 1991), který obsahoval dimenzi sociosexuálního chování a postojů, v roce 2008 nahrazen novou verzí, tzv. revidovaným inventářem sociosexuální orientace (SOI-R; Penke & Asendorpf, 2008). Toto nové pojetí sociosexualitu rozdělilo na tři základní komponenty: 1) sociosexuální chování, tedy zda jedinec navazuje spíše krátkodobé či dlouhodobé vztahy; 2) sociosexuální postoje vůči nezávazným a nahodilým sexuálním vztahům, a; 3) sociosexuální touhy. Samotný inventář je tvořen celkem devíti otázkami/prohlášeními, z čehož každou komponentu tvoří tři samostatné otázky. Respondent na ně odpovídá na devíti nebo pěti bodové Likertově škále. První dvě otázky dotazníku měří aspekt chování a jsou převzaty z původní verze dotazníku SOI. Jedná se o počet sexuálních partnerů za poslední uplynulý rok a počet partnerů, s kterými měl respondent sex pouze "na jednu noc". Ve třetí otázce je jedinec dotazován, s kolika různými partnery měl sex, a to i přestože s nimi neměl zájem o dlouhodobý vztah. Druhá třetina inventáře je zaměřena na sociosexuální postoje. Respondent má ohodnotit míru ne/souhlasu s tvrzeními, že „Sex bez lásky je OK.“,

„Neměl/a bych problém si užít „příležitostný“ sex s různými partnery.“ a „Nechci mít sex, dokud si nejsem jistá/ý, že s partnerem máme vážný dlouhodobý vztah“. Poslední část dotazníku je zaměřena na aspekt sociosexuální touhy, která byla v původní verzi opomenuta. Respondent je v něm dotazován na své sexuálních fantazie a touhy po jedincích, se kterými nemá partnerský vztah. Sečtením všech devíti položek se získá celkové skóre sociosexuální orientace. Rovněž je ale možné pracovat s jednotlivými komponenty odděleně. Čím je pak skór vyšší (ať celkový nebo jen pro danou komponentu), tím má jedinec méně restriktivní sociosexuální chování/postoje/touhy a celkově tendenci navazovat nezávazné sexuální vztahy (Penke & Asendorpf, 2008). Je ovšem nutné poznamenat, že spíše než na krajích škál se většina lidí pohybuje okolo jejího středu směrem k restriktivní či nerestriktivní sociosexualitě, případně vykazuje tendenci ke kombinaci restriktivní a nerestriktivní sociosexualitě v rámci tří uvedených komponent, tj. jedinec bude mít například nerestriktivní sociosexuální touhu, ale restriktivní sociosexuální chování. Je také otázkou, jak se to má s proměnlivostí sociosexuality a jejích komponent v průběhu jedincova života. Předchozí výzkumy sice ukazují, že fenotypová variabilita v sociosexualitě je ovlivněna jednak nesdíleným prostředím a nehledě na pohlaví ji téměř z 50 % ovlivňují i geny (Bailey a kol., 2000), ale rovněž se ukazuje, že sociosexualita je proměnlivá v rámci ontogeneze jedince, kdy starší lidé bývají více sociosexuální restriktivní než lidé mladší (např. Arnett, 2000; Simpson & Gangestad, 1992).

Sociosexuální orientace se každopádně v průběhu posledních let ukázala jako vhodný nástroj v rámci výzkumu krátkodobých a dlouhodobých párovacích strategií (Penke & Asendorpf, 2008). Velké množství výzkumů poukazuje na to, že v sociosexualitě existují pohlavní rozdíly, kdy muži mají v průměru méně restriktivní sociosexualitu než ženy, a to nehledě na její jednotlivé komponenty (např. Lippa, 2009;

Petersen & Hyde, 2011; Rodrigues & Lopes, 2017; Schmitt, 2005). Rovněž se ukazuje, že tyto pohlavní rozdíly jsou univerzální a nezávislé na dané společnosti a kultuře (Lippa, 2009; Schmitt, 2005). Je ale nutné podotknout, že i přes tyto pohlavní rozdíly existuje mezi jedinci v rámci jednoho pohlaví obrovská variabilita (Lippa, 2009; Schmitt, 2007) a tyto rozdíly v rámci jednoho pohlaví mohou být dokonce větší než mezi nimi (Gangestad & Simpson, 2000). Gangestad a Simpson (2000) ve svém výzkumu zanalyzovali data z Bussovy a Schmittovy (1993) studie a zjistili, že pohlavní rozdíly v tendenci navazovat krátkodobé vztahy vysvětlovaly méně než jednu čtvrtinu rozptylu. Je proto pravděpodobné, že na tyto pohlavní rozdíly v sociosexualitě mají vliv i další faktory, než jen biologické pohlaví daného jedince. Velká část předchozích výzkumů se proto zaměřila na další charakteristiky, jako jsou partnerské preference a různé individuální charakteristiky jedinců (např. atraktivita, míra femininity-maskulinity, osobnost, sociodemografické charakteristiky apod.), které mohou se sociosexualitou úzce souviset.

Jak již bylo naznačeno, zdá se, že sociosexualita jedince může být ovlivněna věkem. Sociosexualita se, podobně jako některé osobností rysy (např. extraverze, se kterou sociosexuální orientace souvisí, viz dále), věkem snižuje. Respektive z nerestriktivní se posouvá směrem k restriktivní, přičemž se tento posun objevuje především u komponenty sociosexuálního chování (Jankowski, Díaz-Morales, Vollmer, & Randler, 2014). Věkem se také stírají výše zmíněné pohlavní rozdíly. Ukazuje se totiž, že u mužů a žen nad 40 let již pohlavní rozdíly v sociosexualitě nebývají signifikantní (Bleske-Rechek & Buss, 2001). Kromě věku má na sociosexualitu vliv i to, zda je jedinec v dlouhodobém vztahu. Ukazuje se, že jedinci v dlouhodobém vztahu tíhnou spíše k restriktivní sociosexualitě, než jedinci nezadaní (Rodrigues & Lopes, 2017; Simpson, Wilson, & Winterheld, 2004). Dalším sociodemografickým faktorem,

který může mít na sociosexualitu jedince vliv, je ekonomická soběstačnost jedince. Ve své mezikulturní studii Schmitt (2005) zjistil, že ženy, které jsou ekonomicky závislejší na mužích, v souladu se navrženou teorií strategického pluralismu vykazují orientaci spíše na dlouhodobé párovací strategie. Muži měli naopak tendenci orientovat se na smíšené či krátkodobé strategie, ale jen pokud žili v zemích a prostředí, které bylo genderově spíše rovnoprávné, a ženy v něm nebyly tolik finančně závislé na mužích. Přestože se v tomto výzkumu ukázalo, že mezi muži a ženami existují pohlavní rozdíly (pravděpodobně kvůli minimálním reprodukčním a rodičovským investicím), tak se konkrétní párovací strategie (a tedy i míra sociosexuality) odvíjely až od okolního prostředí.

Větší množství studií se dále zaměřilo na korelaci sociosexuality a osobnostních charakteristik. Wright a Reise (1997) zjistili, že vyšší míra extraverze a nižší míra neuroticismu souvisí s nerestriktivní sociosexualitou. Další výzkum ukázal, že lidé, kteří jsou impulzivnější a častěji vyhledávají nové zážitky, vykazují méně restriktivní sociosexualitu a jedinci, kteří jsou méně otevřené vůči novým zážitkům a nejsou tolik ochotní porušovat pravidla, bývají v sociosexualitě naopak restriktivní (Wright, 1999). V další studii se ukázalo, že restriktivní sociosexualita souvisí s vyšší svědomitostí a nižší otevřenosti vůči novým zkušenostem (Probst, 1999). Sociosexualita se také zdá být propojena s tzv. Temnou triádou, což je koncept tří sociálně averzivních osobnostních charakteristik: machivellianismu, narcismu a psychopatie. Psychopatie se vyznačuje bezcitným působením, bezohlednou manipulací a tendencí k vykořisťování, narcismus se vyznačuje dominancí, exhibicionismem, pocity nadřazenosti, machiavellianismus odkazuje k manipulativnosti, upřímnosti a bezcitnosti (Paulhus & Williams, 2002). Všechny tři komponenty Temné triády vykazují středně silné pozitivní korelace s nerestriktivní sociosexualitou a rovněž se ukazuje, že korelují s dalšími

indikátory, které jsou spojovány krátkodobou párovací strategií (Jonason a kol. 2009). K obdobnému zjištění došel ve svém mezikulturním výzkumu i Schmitt a kolektiv (2017). Z uvedených výzkumů se tak zdá, že některé osobnostní charakteristiky mohou nerestriktivním jedincům pomáhat uplatňovat krátkodobé párovací strategie a naopak jedincům restriktivním strategie dlouhodobé (Simpson a kol., 2004).

Míra restriktivnosti sociosexuality může mít rovněž vliv nejen na párovací strategii (krátkodobý vs. dlouhodobý vztah), ale i na partnerské preference. Jedna z prvních studií, která se zaměřovala na sociosexualitu a partnerské preference ukázala, že méně restriktivní jedinci spíše preferují fyzicky atraktivní partnery a restriktivnější jedinci vyhledávají partnery, kteří jsou zodpovědnější a vlídnější (Simpson & Gangestad, 1991). Ve své navazující studii Gangestad a Simpson (1992) potvrdili předchozí zjištění a kromě toho zjistili, že si nerestriktivní jedinci u svých potencionálních partnerů cenní sexuální přitažlivosti a oblíbenosti, kdežto restriktivní preferovali kromě uvedených charakteristik ještě věrnost, upřímnost a dobrotivost, což jsou charakteristiky, které bývají označovány za vlastnosti, kterými by měli disponovat rodiče. Herold a Milhausen (1999) se ve svém výzkumu zaměřili na partnerské preference žen. Participantkám předložili popisy potenciálních partnerů, přičemž pro jeden typ použili označení *nice guys* a pro druhý typ *bad guys*. *Nice guys* byli popisováni charakteristikami, které v přechozích výzkumech Gangestada a Simpsona (1991; 1992) preferovali sociosexuálně restriktivní jedinci a *bad guys* byli popisováni charakteristikami, které předtím preferovali nerestriktivní jedinci. Výzkumníci následně ženy nechali ohodnotit, jak moc by s daným mužem chtěly jít na romantickou schůzku. Sociosexuálně nerestriktivní ženy volily častěji muže z kategorie *bad guys* a muže z kategorie *nice guys* považovaly za nudné a nezajímavé. Většina žen (nehledě na sociosexualitu) také udávala, že *nice guys* se více hodí pro dlouhodobý vztah. Autoři

tohoto výzkumu při zadání ženám ale neupřesnili, zda si vybírají potencionálního partnera pro krátkodobý či dlouhodobý vztah, což může hrát podstatnou roli. Wilbur a Campbell (2010) se proto zaměřili na souvislost mezi partnerskými preferencemi, sociosexualitou a typem vztahu. Ve své studii definovali a zkoumali tři typy vztahu podle míry závazku: jednorázový sexuální vztah, randění a vážný dlouhodobý vztah. Výsledky jejich studie ukázaly, že v rámci první kategorie (jednorázový sexuální vztah) kladly nerestriktivní ženy důraz především na partnerovu atraktivitu. U druhé kategorie, nehledě na míru restriktivnosti sociosexuality, ženy udávaly, že je pro ně důležitá nejen fyzická atraktivita jedince, ale i partnerovy ambice. U dlouhodobého vztahu se také neprokázal vliv sociosexuální orientace na partnerské preference, oba typy žen (restriktivní i nerestriktivní) totiž u partnerů před fyzickou atraktivitou preferovaly ambice.

Co se týče sociosexuality a jejího vlivu na spokojenost, stabilitu a kvalitu partnerského vztahu, výsledky výzkumů ukazují, že v porovnání s restriktivními jedinci muži i ženy s ne restriktivní sociosexualitou reportují nižší spokojenost ve vztahu (především v oblasti sexuality) a také více partnerských konfliktů a hádek (Webster a kol., 2015). Méně restriktivní sociosexualita totiž koreluje s nižším emočním závazkem vůči partnerovi, nižší vztahovou angažovaností a otevřeností vůči protějšku (tamtéž). Další výzkumy se zaměřily na nevěru. Nepřekvapivě se ukazuje, že lidé s nerestriktivní sociosexualitou své partnery častěji podvádí, flirtují s jinými osobami (Ostovich & Sabini, 2004), či cíleně vyhledávají potenciální partnery (Simpson a kol., 2004). Co se týče postojů k nevěře, tak mají tendenci ji spíše ospravedlňovat tím, že jsou nespokojeni se svým nynějším partnerem, silně je přitahuje někdo jiný, nebo se skrze nevěru partnerovi mstí (Mattingly a kol., 2011; Rodrigues a kol., 2017).

Dále se ukazuje, že nehledě na typ vztahu, bývají nerestriktivní ženy hodnoceny jako fyzicky atraktivnější (Fisher, Hahn, DeBruine, & Jones, 2016). Boothroyd a kolektiv (2008) vytvořili kompozity sociosexuálně restriktivních i nerestriktivních mužů a žen, které následně nechali ohodnotit. Výsledky ukázaly, že na rozpoznání míry sociosexuální orientace jsou citlivější spíše ženy. Obě pohlaví hodnotila jako atraktivnější kompozity nerestriktivních žen a nerestriktivní muži byli hodnoceni jako maskulinnější, na což poukazují i výsledky jiných studií (např. Arnocky a kol., 2018; Kruger, 2006). U žen se korelace mezi mírou femininity/maskulinity a sociosexuality neprokázala. Nerestriktivní sociosexualita sice měla tendenci souviset s feminnějšími rysy, ale výsledky nebyly signifikantní. Spojitost mezi sociosexualitou a mírou maskulinity a femininity daného jedince (tj. jeho genderové a/typičnosti) nemusí být vždy ale přímočará. Některé předchozí výzkumy naznačují, že nerestriktivní ženy disponují spíše maskulinnějšími rysy (Clark, 2004; Howard & Perilloux, 2017; Mikach & Bailey, 1999; Ostovich & Sabini, 2004), což autoři vysvětlují například tím, že maskulinní ženy byly v prenatálním i v aktuálním období pravděpodobně vystaveny většímu množství androgenů, což může mít následně vliv na jejich větší libido (Hampson, Rovet, & Altmann, 1998). Nižší restriktivita v sociosexualitě maskulinních žen může také odrážet tzv. rychlou životní strategii (Luoto, Krams, & Rantala, 2019), která je typická dřívější reprodukcí daného jedince a i vyšším počtem sexuálních partnerů. Další studie poukazují na spojitost mezi nerestriktivní sociosexualitou a femininitou, protože femininní rysy jsou považovány za atraktivnější a to poskytuje těmto ženám více možností (Fisher a kol., 2016). V mezikulturní studii Varelly a kolektivu (2014) se ukázalo, že nerestriktivní sociosexualitu vykazovaly jak maskulinní i femininní ženy. Maskulinnější ženy udávaly ale nerestriktivní sociosexuální chování a femininnější sociosexuální touhu. U mužů se spojitost maskulinity a sociosexuality

neukázala. Souvislost sociosexuality a femininity/maskulinity rovněž naznačuje i mezikulturní studie, kde byly porovnávány odpovědi heterosexuálních i homosexuálních respondentů z Brazílie a České republiky, která se věnuje kapitola č. IV. V tomto výzkumu jsme se zaměřili na genderovou a/typičnost jedince v dětství a v dospělosti. Výsledky ukázaly, že vyšší genderová atypičnost (tj. maskulinita žen a femininita mužů) souvisí pozitivně s vyšší mírou nerestriktivní sociosexuality. Vzhledem k odlišným výsledkům výše uvedených studií, je pravděpodobné, že sociosexualitu ovlivňuje u daného jedince spíše kombinace maskulinních a femininních znaků, než pouze maskulinita či femininita. Gender (či pohlavní role) totiž můžeme chápat jako expresi maskulinních a femininních charakteristik na úrovni morfologických, behaviorálních a kognitivně-psychologických ukazatelů (Bártová, Štěrbová, & Varella Valentova, 2016), a je tedy možné, že nerestriktivní jedinci disponují například pohlavně typickými morfologickými znaky, ale v dimenzi kognitivně-psychologické mohou být spíše atypičtí, což je následně v párovacích strategiích může zvýhodňovat. Fyzicky maskulinní muž s určitými femininími osobnostními charakteristikami tak může představovat kombinaci charakteristik poukazujících na dobré geny a i rodičovské kvality, což může být atraktivní pro potencionální partnerky (Bártová, Štěrbová, Varella, & Valentova; Pereira a kol., 2019)

Co se týče dalších aspektů sexuality, tak se ukazuje, že sociosexuálně nerestriktivní muži i ženy uvádějí v průměru vyšší počet partnerů a větší touhu po sexuální rozmanitosti, než jedinci s restriktivní sociosexualitou (Ostovich & Sabini, 2004; Schmitt, 2005). Míra restriktivnosti sociosexuality také může ovlivňovat pozornostní zkreslení vůči sexuálním stimulům (Prause, Janssen, & Hetrick, 2008; Novák, Bártová, Vagenknecht, & Klapilová, v recenzním řízení), na což jsme se zaměřili blíže v kapitole č. V.

Dále se ukazuje, že sociosexualita koreluje se sexuálně inhibičními a excitačními faktory teoretického model sexuální odezvy tzv. *Duálního modelu kontroly sexuální reakce* (*Dual control model;* Janssen a kol., 2002). Na bližší souvislost mezi duálním modelem kontroly sexuální reakce, sociosexualitou a osobnostními faktory u heterosexuálních mužů a žen z České republiky, jsme se zaměřili ve výzkumu, který je prezentovaný v kapitole č. VI. Duální model kontroly sexuální reakce je založen na předpokladu, že sexuální vzrušení a s ním související chování závisí na rovnováze mezi sexuální excitací a inhibicí. Podle tohoto modelu se od sebe jedinci liší v náchylnosti k sexuální excitaci a k sexuální inhibici a tyto individuální rozdíly vysvětlují další značnou část variability v lidské sexualitě (Janssen & Bancroft, 2007). V rámci duálního modelu kontroly sexuální reakce se předpokládá zapojení dvou neurofyziologických systémů. První se týká aktivace a druhý potlačování sexuální reakce, podobně jako "konceptuální nervový systém" navržený Grayem (1970). Sexuální reakce je tedy výsledkem interakce těchto dvou systémů. Autoři postavili svůj model na třech předpokladech (Janssen & Bancroft, 2007): 1) Neurobiologické inhibice sexuální odezvy jsou adaptivním modelem, který je relevantní u všech živočišných druhů. Snižuje pravděpodobnost sexuální odezvy a rušivých účinků sexuálního vzrušení, pokud se jedinec vyskytuje v situaci, kdy může být sexuální aktivita nevýhodná nebo nebezpečná. 2) Jedinci se od sebe liší v míře sexuální excitace a inhibice. Pro většinu lidí jsou tyto sklony k určité míře excitace a inhibice adaptivní a bezproblémové, nicméně jedinci s neobvykle vysokou mírou excitace nebo nízkou mírou inhibice častěji vykazují vysoce rizikové či jinak problematické sexuální chování. Naopak jedinci s nízkou mírou sexuální excitace nebo vysokou mírou k sexuální inhibice se často vyznačují sexuálními dysfunkcemi. 3) Přestože jsou určitý situační kontext a kulturní významy důležitým zdrojem excitačních a inhibičních stimulů, tyto

podněty jsou zprostředkovány skrze psychologické a neurofyziologické vlastnosti daných jedinců a jsou proto ovlivněné jak genetickými faktory, tak faktorem učení v raném věku. Sexuální excitační a inhibiční mechanismy jsou tak podle autorů výsledkem evoluce a v mnoha situacích mají adaptivní funkci, přičemž finální funkcí excitačního systému je v případě nalezení vhodného partnera zajistit připravenost k reprodukci. Inhibiční systém pak hraje významnou roli v následujících případech (Bancroft, 1999): 1) Pokud se vyskytne nebezpečí spojené se sexuální situací (např. fyzické ohrožení); 2) pokud se objeví hrozba nezávisle na sexuální situaci, kdy je ale potřeba sexuální reakci potlačit a zaměřit se na vzniklý problém (např. napadení predátorem); 3) v případě, že sexuální aktivita odvádí pozornost dalšího důležitého adaptivního chování (např. hledání potravy); 4) v situacích, kdy okolní podmínky nutí k potlačení reprodukčního chování (např. nedostatek potravy); 5) pokud dojde během krátké doby k nadměrné sexuální aktivitě, což může především u mužů vyvolat neschopnost sexuálního styku. Excitační a inhibiční procesy jsou tedy biologicky, ontogeneticky a sociálně podmíněné a zároveň na ně působí i aktuální situace, ve které se jedinci nachází. Výsledky našeho výzkumu ukázaly, že sexuálně excitační i inhibiční faktory korelují jak s některými osobnostními rysy a mírou sociosexuality, a dále že souvisí i s biologickým pohlavím a sexuální orientací. Konkrétně se ukázalo, že sexuálně excitační faktor pozitivně koreluje s otevřeností u heterosexuálních mužů a žen a s extraverzí u heterosexuálních a heterosexuálních žen, ale nikoli u mužů. Sexuálně inhibiční faktor negativně koreloval s extraverzí a pozitivně s neurotismem napříč všemi skupinami s výjimkou heterosexuálních mužů. Co se týče sociosexuality, tak ta podle očekávání pozitivně korelovala s mírou excitačního faktoru a negativně s faktory inhibičními (Bártová, Novák, Weiss, & Klapilová, v recenzním řízení).

Cíle práce

Předložená práce má několik hlavních cílů. Zaprvé, shrnout hlavní východiska a teorie týkající se sexuálního chování a preferencí v kontextu evoluční psychologie. Zadruhé, vysvětlit, jak evoluční psychologie a sexuologie pohlíží na některé méně obvyklé sexuální preference a poruchy sexuálního chování (parafílie) a následně prozkoumat jejich četnost v České republice skrze reprezentativní vzorek mužů a žen. Zatřetí, prozkoumat individuální rozdíly v sexuální chování (sociosexualitu) jedinců v kontextu jejich femininity-maskulinity, osobnostních faktorů a míry individuální excitace a inhibice. A za čtvrté, testovat, zda u jedinců dochází k pozornostnímu zkreslení vůči sexuálním podnětům a jestli toto pozornostní zkreslení může ovlivňovat právě jedincova míra sociosexuality a případná deprese.

Cíle přiložených prací:

I. Klapilová K., & **Bártová K.** (2017). *Sexual Pathology*. In: Shackelford T., Weekes-Shackelford V. (eds) Encyclopedia of Evolutionary Psychological Science. Springer, Cham. DOI 10.1007/978-3-319-16999-6_3382_1.

$Cíl_I$: Kriticky shrnout a představit hlavní východiska evolučního přístupu aplikovaného na poruchy sexuálních preferencí a chování a popsat hlavní teoretická východiska oboru evoluční sexuologie, které následně aplikujeme na vybrané poruchy sexuálních preferencí.

II. **Bártová, K.**, Androvičová, R., Krejčová, L., Weiss, P., & Klapilová, K. (2020). The prevalence of paraphilic interests in the Czech population:

preference, arousal, the use of pornography, fantasy, and behavior. *The Journal of Sex Research*, 1-11. DOI: 10.1080/00224499.2019.1707468

$Cíl_{II}$: Hlavním cílem studie bylo skrze online reprezentativní vzorek mužů a žen z České republiky zjistit, jaká je prevalence u třinácti vybraných poruch sexuální preference a dále u nich prozkoumat jednotlivé dimenze sexuální zkušenosti (preference, vzrušivost, erotické fantazie, konzumaci pornografie a skutečné chování).

III. **Bártová, K.**, Štěrbová, Z., Varella, M. A. C., & Valentova, J. V. (2020). Femininity in men and masculinity in women is positively related to sociosexuality. *Personality and Individual Differences*, *152*, 109575.

$Cíl_{III}$: Testovat vztah mezi genderovou non/konformitou (tj. femininitou-maskulinitou) a sociosexualitou u heterosexuálních a homosexuálních mužů a žen z Brazílie a České republiky.

IV. Novák, O., **Bártová, K.**, Vagenknecht, V., & Kateřina Klapilová, K. (2020). Attention Bias to and Recognition of Sexual Images. *Frontiers in Psychology - Health Psychology.* (v recenzním řízení).

$Cíl_{IV}$: Testovat míru pozornostních zkreslení vůči sexuálním stimulům a prozkoumat, zda je toto pozornostní zkreslení ovlivněno jednak sociosexualitou a za druhé mírou deprese účastníků výzkumu.

V. **Bártová, K.**, Novák, O., Weiss, P. & Klapilová, K. (2020). The personality traits and sociosexual orientation are related to the sexual inhibition and sexual excitation scales: evidence from the Czech Republic. *Personality and Individual Differences* (v recenzním řízení).

Cíl$_V$: Testovat vztah mezi mírou sexuální inhibice a sexuální excitace, osobnostními rysy a sociosexualitou u heterosexuálních a homosexuálních mužů a žen z České republiky. A dále na vzorku heterosexuálních a homosexuálních mužů a žen z České republiky ověřit validitu české verze dotazníku sexuální inhibice a sexuální excitace (SIS/SES).

Závěr

Jak bylo naznačeno v první kapitole, párovací strategie se liší především podle délky trvání a míry závazku. Na základě těchto strategií se u člověka objevuje i velké množství podob sexuálních vztahů, které mohou variovat od jednorázových sexuálních kontaktů, až po vážné dlouhodobé vztahy, jako je manželství. Výše popsaná teorie pohlavních strategií se soustředí především na dimenzi pohlavní rozdílů v párovacích strategiích, které jsou odvislé od asymetrie v minimálních rodičovských investicích. Teorie strategického pluralismu a s ním spojený metodologický konstrukt sociosexuální orientace oproti tomu více osvětluje rozdíly v rámci daného pohlaví. Uvedené teorie se ale nemusí nutně vylučovat, ale mohou se na určitých úrovních naopak navzájem doplňovat. Rovněž se může stát, že krátkodobé párovací strategie povedou k dlouhodobým vztahům a naopak. To, ke které strategii se bude daný jedinec ve výsledku nevědomky klonit, závisí tak především na 1) jeho pohlaví, 2) na jeho individuálních charakteristikách, jako je věk, osobnost, mate value, sociosexuální orientace apod. 3) na prostředí, ve kterém se nachází a na 4) kulturních faktorech (Bártová & Štěrbová, 2020; Marzoli a kol. 2018). A právě proto můžeme u člověka nalézt v párovacích strategiích velké rozdíly nejen mezi pohlavími, ale také mezi nimi.

Rovněž je důležité si uvědomit, že ne všechny vztahy, a ne všechny sexuální aktivity, vedou nutně k reprodukci. Romantické vztahy mohou podporovat formování sociálních koalic (Bártová & Valentová, 2012; Lancester, 1975); za sex může být jedinci poskytnuta fyzická ochrana (Hrdy, 1981) nebo může být vyměněn za jídlo a jiné cenné komodity (Hill, 1982). V evoluční historii člověka tak sex do určité míry převzal sociální funkci a začal se objevovat i různých situačních kontextů. Jinými slovy ultimátní (evoluční) příčina sexu, kterou je reprodukce, se nemusí vylučovat s dalšími sociálními a adaptivními funkcemi sexuality. Což má v konečném důsledku opět

částečně za následek velkou variabilitu v lidském sexuálním chování a preferencích. Znalost těchto evolučně vyvinutých strategií a modulujících faktorů je potom klíčová, pokud chceme zjistit, proč se za určitých okolností objevují některé sexuální preference a proč se některé sexuální chování a párovací strategie aktivuje a jiná naopak ne.

Reference

Alcock, J. (2009). *Animal behavior: An evolutionary approach*. Sinauer Associates.

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American psychologist*, 55(5), 469.

Arnocky S. (2016). Intrasexual Rivalry Among Women. In: Weekes-Shackelford V., Shackelford T., Weekes-Shackelford V. (eds) *Encyclopedia of Evolutionary Psychological Science*. Springer, Cham

Arnocky, S., & Carré, J. M. (2016). Intrasexual rivalry among men. In: Weekes-Shackelford V., Shackelford T., Weekes-Shackelford V. (eds) *Encyclopedia of Evolutionary Psychological Science*. Springer, Cham

Arnocky, S., Carré, J. M., Bird, B. M., Moreau, B. J., Vaillancourt, T., Ortiz, T., & Marley, N. (2018). The facial width-to-height ratio predicts sex drive, sociosexuality, and intended infidelity. *Archives of Sexual Behavior*, *47*(5), 1375-1385.

Bailey, J., Kirk, K. M., Zhu, G., Dunne, M. P., & Martin, N. G. (2000). Do individual differences in sociosexuality represent genetic or environmentally contingent strategies? Evidence from the Australian twin registry. *Journal of Personality and Social Psychology, 78,* 537–545.

Bancroft, J. (1999). Central inhibition of sexual response in the male: A theoretical perspective. *Neuroscience and Biobehavioral Reviews*, *23*, 763-784.

Barrett, E. S., Tran, V., Thurston, S., Jasienska, G., Furberg, A. S., Ellison, P. T., & Thune, I. (2013). Marriage and motherhood are associated with lower testosterone concentrations in women. *Hormones and behavior*, *63*(1), 72-79.

Bártová K., Štěrbová Z. (2020). Mating Strategies. In: Shackelford T., Weekes-Shackelford V. (eds) *Encyclopedia of Evolutionary Psychological Science*. Springer, Cham. DOI: 10.1007/978-3-319-16999-6_684-1

Bártová, K., & Valentova, J. (2012). Evolutionary perspective of same-sex sexuality: Homosexuality and homosociality revisited. *Anthropologie (1962-)*, *50*(1), 61-70.

Bártová, K., Štěrbová, Z., & Valentová, J. V. (2016). Souvislost genderové nonkonformity a mužské homosexuální orientace. *Ceskoslovenska Psychologie*, *60*(2).

Bártová, K., Štěrbová, Z., Varella, M. A. C., & Valentova, J. V. (2020). Femininity in men and masculinity in women is positively related to sociosexuality. *Personality and Individual Differences*, *152*, 109575.

Bateman, A. J. (1948). Intra-sexual selection in Drosophila. *Heredity*, *2*(3), 349-368.

Bjorklund, D. F., & Shackelford, T. K. (1999). Differences in parental investment contribute to important differences between men and women. *Current directions in psychological science*, *8*(3), 86-89.

Bleske-Rechek, A. L., & Buss, D. M. (2001). Opposite-sex friendship: Sex differences and similarities in initiation, selection, and dissolution. *Personality and Social Psychology Bulletin*, *27*(10), 1310-1323.

Boothroyd, L. G., Jones, B. C., Burt, D. M., DeBruine, L. M., & Perrett, D. I. (2008). Facial correlates of sociosexuality. *Evolution and Human Behavior*, *29*(3), 211-218.

Brooks, R. C., Shelly, J. P., Jordan, L. A., & Dixson, B. J. (2015). The multivariate evolution of female body shape in an artificial digital ecosystem. *Evolution and Human Behavior*, 36(5), 351-358.

Busche, L., Marks, M., & Oates, K. (2013). The effect of recent sexual activity on partner desirability: An evolutionary perspective. *Journal of Social, Evolutionary, and Cultural Psychology*, 7(1), 51.

Buss D.M., Schmitt D.P. (2016). *Sexual Strategies Theory*. In: Shackelford T., Weekes-Shackelford V. (eds) Encyclopedia of Evolutionary Psychological Science. Springer, Cham. DOI: 10.1007/978-3-319-16999-6

Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and brain sciences*, 12(1), 1-14.

Buss, D. M., & Shackelford, T. K. (2008). Attractive women want it all: Good genes, economic investment, parenting proclivities, and emotional commitment. *Evolutionary Psychology*, 6, 134–146.

Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: an evolutionary perspective on human mating. *Psychological review*, *100*(2), 204.

Buss, D. M., & Schmitt, D. P. (2019). Mate preferences and their behavioral manifestations. *Annual Review of Psychology*, *70*, 77-110.

Buss, D. M., Goetz, C., Duntley, J. D., Asao, K., & Conroy-Beam, D. (2017). The mate switching hypothesis. *Personality and Individual Differences*, *104*, 143-149.

Buunk, B. P., Dijkstra, P., Kenrick, D. T., & Warntjes, A. (2001). Age preferences for mates as related to gender, own age, and involvement level. *Evolution and Human Behavior, 22*(4), 241-250.

Castro, F. N., & de Araújo Lopes, F. (2011). Romantic preferences in Brazilian undergraduate students: From the short term to the long term. *Journal of Sex Research, 48*(5), 479-485.

Clark, A. P. (2004). Self-perceived attractiveness and masculinization predict women's sociosexuality. *Evolution and Human Behavior*, *25*(2), 113-124.

Darwin, C. (1859/2007): *O vzniku druhů přírodním výběrem.* 3. vydání. Praha: Academia.

Darwin, C. R. (1871/2005). *O pohlavním výběru*. Praha: Academia

Dixson, B. J. (2016). Masculinity and femininity. *Encyclopedia of Evolutionary Psychological Science. Springer. https://doi. org/10.1007/978-3-319-16999-6_*, 3389-1.

Dixson, B. J. W., Sulikowski, D., Gouda-Vossos, A., Rantala, M. J., & Brooks, R. C. (2016). The masculinity paradox: facial masculinity and beardedness interact to determine women's ratings of men's facial attractiveness. *Journal of Evolutionary Biology, 29*(11), 2311-2320.

Durante, K. M., Eastwick, P. W., Finkel, E. J., Gangestad, S. W., & Simpson, J. A. (2016). Pair-bonded relationships and romantic alternatives: Toward an integration of evolutionary and relationship science perspectives. In *Advances in experimental social psychology* (Vol. 53, pp. 1-74). Academic Press.

Fisher, C. I., Hahn, A. C., DeBruine, L. M., & Jones, B. C. (2016). Is women's sociosexual orientation related to their physical attractiveness?. *Personality and Individual Differences*, *101*, 396-399.

Fisher, M., Cox, A., Bennett, S., & Gavric, D. (2008). Components of self-perceived mate value. *Journal of Social, Evolutionary, and Cultural Psychology*, 2(4), 156.

Flegr, J. (2007): *Úvod do evoluční biologie.* Praha: Academia.

Flegr, J., (2004): *Evoluční biologie.* Praha: Academia.

Gangestad, S. W., & Simpson, J. A. (1990). Toward an evolutionary history of female sociosexual variation. *Journal of personality*, *58*(1), 69-96.

Gangestad, S. W., & Simpson, J. A. (2000). The evolution of human mating: Trade-offs and strategic pluralism. *Behavioral and brain sciences*, *23*(4), 573-587.

Gangestad, S. W., Thornhill, R., & Garver-Apgar, C. E. (2005). Women's sexual interests across the ovulatory cycle depend on primary partner developmental instability. *Proceedings of the Royal Society B: Biological Sciences, 272*(1576), 2023-2027.

Gildersleeve, K., Haselton, M. G., & Fales, M. R. (2014). Do women's mate preferences change across the ovulatory cycle? A meta-analytic review. *Psychological Bulletin, 140*(5), 1205.

Grammer, K., Fink, B., Møller, A. P., & Thornhill, R. (2003). Darwinian aesthetics: sexual selection and the biology of beauty. *Biological Reviews, 78*(3), 385-407.

Gray, J.A. (1970). The psychophysiological basis of introversion-extraversion. *Behaviour Research and Therapy, 8,* 249-266.

Guéguen, N. (2011). Effects of solicitor sex and attractiveness on receptivity to sexual offers: A field study. *Archives of Sexual Behavior, 40*(5), 915-919.

Guéguen, N., & Lamy, L. (2012). Men's social status and attractiveness: Women's receptivity to men's date requests. *Swiss Journal of Psychology, 71*(3), 157.

Hald, G. M. (2006). Gender differences in pornography consumption among young heterosexual Danish adults. *Archives of sexual behavior, 35*(5), 577-585.

Hald, G. M., & Høgh-Olesen, H. (2010). Receptivity to sexual invitations from strangers of the opposite gender. *Evolution and Human Behavior, 31*(6), 453-458.

Hampson, E., Rovet, J. F., & Altmann, D. (1998). Spatial reasoning in children with congenital adrenal hyperplasia due to 21-hydroxylase deficiency. *Developmental Neuropsychology*, *14*(2-3), 299-320.

Havlíček J., Rubešová A. (2009). *Atraktivita tváře*. In: V. Blažek, R.Trnka (eds). Lidský obličej. Vnímání tváře z pohledu kognitivních, behaviorálních a sociálních věd. 189-201. Praha: Karolinum.

Herold, E. S., & Milhausen, R. R. (1999). Dating preferences of university women: An analysis of the nice guy stereotype. *Journal of Sex & Marital Therapy*, *25*(4), 333-343.

Hill, A. K., Bailey, D. H., & Puts, D. A. (2017). Gorillas in our midst? Human sexual dimorphism and contest competition in men. In *On human nature* (pp. 235-249). Academic Press.

Hill, K. (1982). Hunting and human evolution. *Journal of Human Evolution, 11*, 521–544.

Howard, R. M., & Perilloux, C. (2017). Is mating psychology most closely tied to biological sex or preferred partner's sex?. *Personality and Individual Differences*, *115*, 83-89.

Hrdy, S. B. (1981). *The woman that never evolved*. Cambridge: Harvard University Press.

Jæger, A. B., Gramkow, A., Sørensen, P., Melbye, M., Adami, H. O., Glimelius, B., & Frisch, M. (2000). Correlates of heterosexual behavior among 23–87 year olds in Denmark and Sweden, 1992–1998. *Archives of Sexual Behavior, 29*(1), 91-106.

Jankowski, K. S., Díaz-Morales, J. F., Vollmer, C., & Randler, C. (2014). Morningness–eveningness and sociosexuality: Evening females are less restricted than morning ones. *Personality and Individual Differences*, *68*, 13-17.

Janssen, E., & Bancroft, J. (2007). The Dual Control Model: The role of sexual inhibition and excitation in sexual arousal and behavior. In E. Janssen (Ed.), *The psychophysiology of sex* (pp. 197–222). Bloomington: Indiana University Press.

Janssen, E., Vorst, H., Finn, P., & Bacroft, J. (2002). The Sexual Inhibition (SIS) and Sexual Excitation (SES) Scales: I. Measuring Sexual Inhibition and Excitation Proneness in men. *The Journal of Sex Research*, *39*(2), 114-126.

Johnston, V. S. (2006). Mate choice decisions: the role of facial beauty. *Trends in cognitive sciences, 10*(1), 9-13.

Jonason, P. K., Li, N. P., Webster, G. D., & Schmitt, D. P. (2009). The dark triad: Facilitating a short-term mating strategy in men. *European Journal of Personality*, 23, 5–18.

Kennair L.E.O., Grøntvedt T.V., Bendixen M., Amundsen T. (2017). Sexual Behavior. In: Shackelford T., Weekes-Shackelford V. (eds) *Encyclopedia of Evolutionary Psychological Science*. Springer, Cham.

Kenrick, D. T., & Keefe, R. C. (1992). Age preferences in mates reflect sex differences in human reproductive strategies. *Behavioral and Brain Sciences, 15*(1), 75-91.

Kenrick, D. T., Keefe, R. C., Gabrielidis, C., & Cornelius, J. S. (1996). Adolescents' age preferences for dating partners: Support for an evolutionary model of life-history strategies. *Child development*, *67*(4), 1499-1511.

Kenrick, D. T., Sadalla, E. K., Groth, G., & Trost, M. R. (1990). Evolution, traits, and the stages of human courtship: Qualifying the parental investment model. *Journal of personality, 58*(1), 97-116.

Kinsey, A. C., Pomeroy, W. B., & Martin, C. E. (1948). *Sexual behavior in the human male*. Philadelphia: Saunders.

Kinsey, A. C., Pomeroy, W. B., Martin, C. E., & Gebhard, P. H. (1953). *Sexual behavior in the human female.* Philadelphia: Saunders.

Kordsmeyer, T. L., Hunt, J., Puts, D. A., Ostner, J., & Penke, L. (2018). The relative importance of intra-and intersexual selection on human male sexually dimorphic traits. *Evolution and Human Behavior*, *39*(4), 424-436.

Kruger, D. J. (2006). Male facial masculinity influences attributions of personality and reproductive strategy. *Personal Relationships*, *13*(4), 451-463.

Lancester, J. (1975). *Primate behaviour and the emergence of human culture*. New York: Holt, Rinehart, & Winston.

Lehmiller, J. J. (2017). *The psychology of human sexuality*. John Wiley & Sons.

Lippa, R. A. (2007). The preferred traits of mates in a cross-national study of heterosexual and homosexual men and women: An examination of biological and cultural influences. *Archives of Sexual Behavior, 36*(2), 193-208.

Lippa, R. A. (2009). Sex differences in sex drive, sociosexuality, and height across 53 nations: Testing evolutionary and social structural theories. *Archives of sexual behavior, 38*(5), 631-651.

Luoto, S., Krams, I., & Rantala, M. J. (2019). A life history approach to the female sexual orientation spectrum: Evolution, development, causal mechanisms, and health. *Archives of Sexual Behavior*, *48*(5), 1273-1308.

Macklon, N. S., & Fauser, B. C. J. M. (1999). Aspects of ovarian follicle development throughout life. *Hormone Research in Paediatrics*, *52*(4), 161-170.

Marzoli, D., Havlíček, J., & Roberts, S. C. (2018). Human mating strategies: From past causes to present consequences. Wiley Interdisciplinary Reviews: *Cognitive Science, 9*(2), e1456.

Mattingly, B. A., Clark, E. M., Weidler, D. J., Bullock, M., Hackathorn, J., & Blankmeyer, K. (2011). Sociosexual orientation, commitment, and infidelity: A mediation analysis. *The Journal of social psychology*, *151*(3), 222-226.

Mikach, S. M., & Bailey, J. M. (1999). What distinguishes women with unusually high numbers of sex partners?. *Evolution and Human Behavior*, *20*(3), 141-150.

Møller, A. P., & Thornhill, R. (1998). Bilateral symmetry and sexual selection: a meta-analysis. *The American Naturalist*, *151*(2), 174-192.

Novák, O., Bártová, K., Vagenknecht, V., & Klapilová, K. Attention Bias to and Recognition of Sexual Images. *Frontiers in Psychology - Health Psychology* (v recenzním řízení).

Ostovich, J. M., & Sabini, J. (2004). How are sociosexuality, sex drive, and lifetime number of sexual partners related?. *Personality and Social Psychology Bulletin*, *30*(10), 1255-1266.

Parker, G. A. (1972). The origin and evolution of gamete dimorphism and the male-female phenomenon. J Theor Biol. *J. theor. Biol*, *36*, 553.

Parker, G. A., & Smith, J. M. (1990). Optimality theory in evolutionary biology. *Nature*, *348*(6296), 27-33.

Paulhus, D. L., & Williams, K. M. (2002). The Dark Triad of personality: Narcissism, Machiavellianism, and psychopathy. *Journal of Research in Personality*, *36*(6), 556–563.

Penke, L., & Asendorpf, J. B. (2008). Beyond global sociosexual orientations: a more differentiated look at sociosexuality and its effects on courtship and romantic relationships. *Journal of personality and social psychology*, *95*(5), 1113.

Pereira, K. J., da Silva, C. S. A., Havlíček, J., Kleisner, K., Varella, M. A. C., Pavlovič, O., & Valentova, J. V. (2019). Femininity-masculinity and attractiveness–Associations between self-ratings, third-party ratings and objective measures. *Personality and Individual Differences*, *147*, 166-171.

Petersen, J. L., & Hyde, J. S. (2010). A meta-analytic review of research on gender differences in sexuality, 1993–2007. *Psychological bulletin, 136*(1), 21.

Petersen, J. L., & Hyde, J. S. (2011). Gender differences in sexual attitudes and behaviors: A review of meta-analytic results and large datasets. *Journal of Sex Research*, 48(2-3), 149-165.

Prakash, A., & Monteiro, A. (2016). Molecular mechanisms of secondary sexual trait development in insects. *Current opinion in insect science*, *17*, 40-48.

Prause, N., Janssen, E., & Hetrick, W. P. (2008). Attention and Emotional Responses to Sexual Stimuli and Their Relationship to Sexual Desire. *Archives of Sexual Behavior*, *37*(6), 934–949.

Probst, S. S. (1999). Long-and short-term mating strategies and the five-factor model of personality. *Dissertation Abstracts International*, 60, 0560B.

Puts, D. (2016). Human sexual selection. *Current Opinion in Psychology*, *7*, 28-32.

Puts, D. A., Welling, L. L., Burriss, R. P., & Dawood, K. (2012). Men's masculinity and attractiveness predict their female partners' reported orgasm frequency and timing. *Evolution and Human Behavior, 33*(1), 1-9.

Roberts, S. C., Havlicek, J., Flegr, J., Hruskova, M., Little, A. C., Jones, B. C., ... & Petrie, M. (2004). Female facial attractiveness increases during the fertile phase of the menstrual cycle. *Proceedings of the Royal Society of London. Series B: Biological Sciences, 271*(suppl_5), S270-S272.

Rodrigues, D., & Lopes, D. (2017). Sociosexuality, commitment, and sexual desire for an attractive person. *Archives of sexual behavior*, 46(3), 775-788.

Saxton, T. K., Mackey, L. L., McCarty, K., & Neave, N. (2016). A lover or a fighter? Opposing sexual selection pressures on men's vocal pitch and facial hair. *Behavioral Ecology*, *27*(2), 512-519.

Scelza, B. A. (2011). Female choice and extra-pair paternity in a traditional human population. *Biology Letters,* 7(6), 889–891.

Schmitt, D. P. (2003). Universal sex differences in the desire for sexual variety: Tests from 52 nations, 6 continents, and 13 islands. *Journal of personality and social psychology*, *85*(1), 85.

Schmitt, D. P. (2005). Sociosexuality from Argentina to Zimbabwe: A 48-nation study of sex, culture, and strategies of human mating. *Behavioral and Brain Sciences*, 28(2), 247-275.

Schmitt, D. P. (2007). Sexual strategies across sexual orientations: How personality traits and culture relate to sociosexuality among gays, lesbians, bisexuals, and heterosexuals. *Journal of Psychology & Human Sexuality*, *18*(2-3), 183-214.

Schmitt, D. P. (2016). Fundamentals of human mating strategies. In D. M. Buss (Ed.), The evolutionary psychology handbook (2nd ed., pp. 294–316). New York: Wiley.

Schmitt, D. P., Alcalay, L., Allik, J., Alves, I. C. B., Anderson, C. A., Angelini, A. L., ... & Bender, S. S. (2017). Narcissism and the strategic pursuit of short-term mating: universal links across 11 world regions of the International Sexuality Description Project-2. *Psychological Topics*, 26, 89–137.

Schützwohl, A., Fuchs, A., McKibbin, W. F., & Shackelford, T. K. (2009). How willing are you to accept sexual requests from slightly unattractive to exceptionally attractive imagined requestors?. *Human Nature, 20*(3), 282-293.

Simpson, J. A., & Gangestad, S. W. (1991). Individual differences in sociosexuality: evidence for convergent and discriminant validity. *Journal of personality and social psychology*, *60*(6), 870.

Simpson, J. A., & Gangestad, S. W. (1992). Sociosexuality and romantic partner choice. *Journal of personality*, 60(1), 31-51.

Simpson, J. A., Wilson, C. L., & Winterheld, H. A. (2004). *The handbook of sexuality in close relationships* (pp. 87–111).

Smith, M. J. L., Deady, D. K., Moore, F. R., Jones, B. C., Cornwell, R. E., Stirrat, M., ... & Perrett, D. I. (2012). Maternal tendencies in women are associated with estrogen levels and facial femininity. *Hormones and Behavior*, *61*(1), 12-16.

Stulp, G., Buunk, A. P., & Pollet, T. V. (2013). Women want taller men more than men want shorter women. *Personality and Individual Differences, 54(8*), 877-883.

Sugiyama, L. (2005). In D. M. Buss (Ed.)., *The handbook of evolutionary psychology*. Physical attractiveness in adaptationist perspective (pp. 292–342). New York: Wiley.

Thornhill, R., & Gangestad, S. W. (2008). *The evolutionary biology of human female sexuality*. Oxford University Press.

Trivers, R. (1972). Parental investment and sexual selection. *Sexual Selection & the Descent of Man, Aldine de Gruyter, New York*, 136-179.

Trivers, R. L. (1985). *Social evolution*. Menlo Park: Benjamin Cummings.

Varella, M. A. C., Valentova, J. V., Pereira, K. J., & Bussab, V. S. R. (2014). Promiscuity is related to masculine and feminine body traits in both men and women: Evidence from Brazilian and Czech samples. *Behavioural processes*, 109, 34-39.

Webster, G. D., Laurenceau, J. P., Smith, C. V., Mahaffey, A. L., Bryan, A. D., & Brunell, A. B. (2015). An investment model of sociosexuality, relationship

satisfaction, and commitment: Evidence from dating, engaged, and newlywed couples. *Journal of Research in Personality*, *55*, 112-126.

Wilbur, C. J., & Campbell, L. (2010). What do women want? An interactionist account of women's mate preferences. *Personality and Individual Differences*, *49*(7), 749-754.

Wright, T. M. (1999). Female sexual behavior: Analysis of big five trait facets and domains in the prediction of sociosexuality.

Wright, T. M., & Reise, S. P. (1997). Personality and unrestricted sexual behavior: Correlations of sociosexuality in Caucasian and Asian college students. *Journal of Research in Personality*, *31*(2), 166-192.

Zentner, M., & Mitura, K. (2012). Stepping out of the caveman's shadow: Nations' gender gap predicts degree of sex differentiation in mate preferences. *Psychological science, 23(10*), 1176-1185.

Kapitola II

Klapilová K., & Bártová K. (2017). *Sexual Pathology*. In: Shackelford T., Weekes-Shackelford V. (eds) Encyclopedia of Evolutionary Psychological Science. Springer, Cham. DOI 10.1007/978-3-319-16999-6_3382_1.

S

Sexual Pathology

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Synonyms

Disorders of sexual preference; Paraphilias; Sexual deviation; Sexual variants

Definition

Sexual pathology or disorders of sexual preference refer to persistent and intense sexual interests lasting at least 6 months, where sexual arousal is in response to atypical fantasies, behaviors, objects, situations, or partners. These behaviors, fantasies, or urges can cause distress, interpersonal difficulties, or functional disorders and usually involve non-consenting persons, nonhuman objects, juveniles, or the infliction of humiliation and suffering.

Introduction

At present, the evolutionary approach is a relatively common theoretical framework for describing and interpreting various aspects of human sexuality, such as differences in sexual behavior between sexes or common sexual responses in the general population. This is coherent considering the fact that the main success criteria are from an evolutionary perspective reproductive success – all psychological, physical, and behavioral traits directly linked to reproduction are of primary interest, and the search for adaptations in this area is intuitive. However, the search for the adaptive meaning of sexual deviations (paraphilias, disorders of sexual preference) is more complicated. This text will introduce the evolutionary approach to the study of paraphilias (or, using evolutionary terminology, "sexual variations"). Firstly, a definition of evolutionary sexology as a scientific framework will be given, along with an explanation of the specifics of the evolutionary frame applied to the disorders and variations linked to sexuality, and finally, with the aid of specific examples of paraphilias, an explanation of the ways in which an evolutionary analysis of particular symptoms in currently diagnosed disorders of sexual preference can be achieved will be given.

T.K. Shackelford, V.A. Weekes-Shackelford (eds.), *Encyclopedia of Evolutionary Psychological Science*,
DOI 10.1007/978-3-319-16999-6_3382-1

What Is Evolutionary Sexology?

Evolutionary sexology is a specific area of evolutionary psychiatry, which, to quote R. Nesse (2002), helps one understand why psychiatric syndromes exist at all and why some of them are so common today. It focuses mainly on evolutionarily ultimate sources, (i.e., what given trait was/is adaptive in the history of evolution for and how it brought reproductive success to our ancestors and also to us). According to Bailey (1991), from the evolutionary perspective, sexual paraphilias are phylogenetic regressions, updated repressed mechanisms, which were adaptive in the past. Evolutionary sexology utilizes a few existing indirect evidences of adaptiveness (behavior strategies or cognitive mechanisms):

1. *High population prevalence*. The prevalence of homosexuality, which was until recently seen as a deviation, ranges today between 5% and 6% across the populations (Diamond 1993). Some sexual paraphilias and dysfunctions, which are still psychiatric diagnoses, have a similar degree of prevalence, for example, various fetishes or sadomasochism.
2. *Similar prevalence across different sociocultural environments.* For example, the sexuality incorporating the submissive or afflicted position of one of the partners and the dominating or pain-inflicting position of the other is found in many human cultures and societies across historical periods studied to date.
3. *Existence of complementary* (i.e., *opposite*) *paraphilia in potential or realistic partners.* For example, mutually consenting sadistic/masochistic practices.
4. *Occurrence among different species closely connected on the phylogenetic tree*. For example, male and even female sexual behavior focused on sexually immature individuals is commonly found in various animal species, including primates, chimpanzees, and bonobos (Dixson 1998).
5. *Connection between the high prevalence of a specific sexual strategy and a specific environment type that can provide reproductive success.* For example, the accelerated arrival of first menstruation has been found to occur in dangerous, scarcely resourced, low-income environments, coupled with a high birth rate and low parental care. First sexual encounters occur sooner and demonstrably more offspring are produced. In these types of environments, greater mating activity is a valuable countermeasure against a relatively truncated life expectancy. It is interesting to note that it is not only a case of adaptation in behavior but also physiology – a significantly lower age of first menstruation means that the timing of biological reproduction forms part of this complex adaptive sexual strategy (Gangestad and Simpson 2000).

The specifics of evolutionary scope applicable to disorders of sexual preference and variations can, therefore, be summarized into the following points: (1) independence of determining what is normal from contemporary environment, society, and culture; (2) emphasis on specific symptoms and relative independence from presently valid medical diagnoses; (3) utilizing findings from classical and human ethology and evolutionary psychology; (4) acknowledging the fact that nature and nurture, the innate and taught, put the finishing touches to the final result of human sexuality; and (5) taking into account the phylogenetic history of sexual behavior, variation, or deviations (Klapilová et al. 2016; Stevens and Price 2016).

Determining Sexual Normality and Abnormality Is Independent from Contemporary Environmental, Societal, and Cultural Norms

While a physician may view rarely occurring phenomena as proof of defects and deviations that are to be normalized or treated, the evolutionary approach considers the same phenomena as a part of natural diversity and variation or as a specific sexual strategy that can, under certain conditions, be adaptive and bring some evolutionary

advantages (Nesse 2002). According to the classical Euro-American medical sexology, sexual behavior is "normal," when between consenting, mature, non-related individuals and when it does not incur psychological or physical damage to either partner. When diagnosing sexual preference disorder, specifying what appears in the sexual fantasies of a person is crucial, specifically the object the person presents sexual attraction toward and who he/she desires to form a partnership with. A psychiatric diagnosis is only necessary when the personal orientation causes the individual (or his/her surroundings) excessive psychological difficulties or adverse effects to their quality of life (excessive stress, suicidal tendencies, feelings of shame and/or guilt) or has led to socially unacceptable or illegal behavior (e.g., the search for underage sexual partners). In other words, paraphilias become a psychiatric problem only when society (or the individual) deems them to be so.

It is important to realize that sexuality is not demonstrated only through behavior, meaning how and with whom one has sex. It does not have to reflect internal preference (Laws and O'Donohue 2008). Apparently, only a minority of people with paraphilias realize their preferred sexuality. Likewise, some sexually *normal* individuals can engage in deviant behavior, even though their preference and sexual fantasies fulfill (in their particular society) traditional concepts of sexual objectification and activity. Therefore, the number of individuals in the population with paraphilic tendencies remains unknown. To determine the prevalence of paraphilic preferences across a population, it is necessary to research not only behavioral experience but also thoughts, fantasies, and arousal toward paraphilic material as well as love emotions toward paraphilic objects.

The Swedish representative research focusing directly on paraphilic behavior noted that 3.1% of men confessed at least one exhibitionist and 7.7% at least one voyeuristic incident (Långström and Seto 2006). Studies targeting pedophile preferences state a prevalence from 0.3 to 3.8% (Mohnke et al. 2014). And lastly, the studies aimed at sadomasochistic experience show, in the USA and Australia, a prevalence from 2.2 to 11% (Hite-Corrie 2012). The fairly high percentage of occurrence detected in previously published studies and their comparisons across different nations and cultures indicate that thinking about the adaptiveness of these sexual strategies is worthy of research.

Emphasis of Individual Symptoms and their Relative Independence from Presently Valid Medical Diagnoses

Another advantage of the evolutionary approach is the perception of individual symptoms (which are part of contemporary medical diagnoses) as independent elements that can have, in different contexts, differing developments and adaptive significance. Individual symptoms may have more adaptive functions, and therefore, it is necessary to look at them from different angles as to avoid their misinterpretation. A fitting example would be that when watching women's physiological reactions under laboratory conditions, women with "normal" sexual preferences (as opposed to paraphilic patients) have been known to react with a significantly more arousal and vaginal lubrication to stimuli showing aggressive sexual activities (Suschinsky and Lalumière 2011). This, however, cannot simply be explained by presuming that most women are sadomasochistic. The evolutionary explanation presents a hypothesis of preparedness, which is an advantage whenever there is an increased chance of forced penetration, lowering the risk of significant genital harm. Lubrication, therefore, functions as an independent body expression, a symptom present in more contexts than simply being reflective of sexual arousal during intercourse with a preferred partner. It also occurs as part of a defense reaction to an expected incident of sexual attack.

The Application of Knowledge from Classical Ethology, Human Ethology, and Evolutionary Psychology

In evolutionary sexology, the application of knowledge from classical ethology, human ethology, and evolutional psychology is a key. Sexual

behavior in humans is derived from a reproductive function. However, throughout human evolution, social groups have gradually grown and gained complexity, and child-rearing has high demands, especially in the acquisition of complicated social abilities. The combination of these factors meant that, during human evolutionary history, sex took on a number of social functions and began to show in different interactive contexts (Thornhill and Gangestad 1996). It is therefore necessary for humans to understand sexuality as more than just a reproductive tool and rather as a collection of adaptations including mater preferences, mate choice, courtship, and finally partnership formation. The ultimate evolutionary function of sex (i.e., reproduction) is not independent of many other adaptive and social functions of sexuality.

Sexuality is not only about sex, but a genital phase, but is also another step forward in establishing a potential partnership or sexual relationship. From the viewpoint of basic sexology research into disorders of sexual preference and sexual dysfunctions, this forms an important perspective. From the evolutionary view, we can consider them, mainly, as disruptions in partner selection and partnership formation (i.e., courtship disorders) leading to the inability to sexually function within partnerships (Freund 1990). Sexuality can also be looked at as a hierarchal system of ordered motivational states (SMS, sexual motivation system), a superior brain mechanism running the functional structuring of fragmentary phases of sexual interaction, defined by authors as the potential partner location, non-tactile/affiliative interaction, tactile interaction, and genital interaction (Madlafousek et al. 1981). This theory was strongly inspired by ethological knowledge of mammals gained in the 1970s, in which courting was distinguished by three phases: (1) attractiveness (paying attention to an object's sexual stimuli with specific physical signs), (2) proceptivity (viewing signals of male/female interest and the attempts at courtship), and (3) receptivity (viewing signs of a female's preparedness for coitus and exercising sexual intercourse; Beach 1976). Before making the next step in the motivation system, the lower motivation level must be satisfactorily completed (e.g., before proceptivity, attractiveness must be established). A male's sexual reaction must therefore proceed in this order: recognizing the female's attractiveness and her sexual interest and then interacting with her until after genital contact. If any of these parts takes place outside its order or is skipped, sexual excitement will be reduced (Madlafousek et al. 1981). Apart from the prioritization of positive patterns that lead to sexual arousal, every motivational level has a matching adverse pattern that lowers sexual excitement and interrupts the transition to the next phase. The key is therefore emphasizing the processes around the perception and production of nonverbal expressions (both positive/stimulant and negative/inhibit) in different phases of courtship. People with paraphilia are therefore, in some older ethological theories, seen as individuals who differ from the typical population exactly in their interpretation of perceived interest/disinterest signals and in their inability to conduct adequate courtship expressions at the correct moment (Freund 1990; Money 1986). This is especially the case with paraphilic individuals who reach sexual arousal and satisfaction atypically (voyeurism, exhibitionism, frotteurism, toucherism, and sexual aggression). The sexual aggressor is able, for example, to perform sexual intercourse with a woman (genital phase), only if not subjected to any signs of seduction from her side. Of course, he himself does not conduct courting behavior. He skips the pre-tactile phase straight to the tactile and genital phases and avoids any interactive synchronization with the woman.

Theoretically, unusual sexual preferences can also arise from an effect similar to imprinting (i.e., an instinctive learning mechanism that takes place during critical development periods). According to Aronsson (2011), the internalization of non-adaptive preference mechanisms (e.g., shoes or other fetishes) is analogical to adaptive preference internalization mechanisms (e.g., our parents' characteristics). Likewise, according to the *erotic target location errors* theory, it is possible to define some paraphilic groups (especially fetishism and transvestism) as development errors when determining the sexual (erotic) object. These errors then lead to a sexual preference for

an object's sexually unimportant attributes, for example, a focus on a woman's shoes instead of the woman herself (Freund and Blachard 1993). It is not clear, though, why some sexual preferences, such as fetishism or transvestism, occur only in a small part of the population. The objects preferred by these people are also, during particular sensitive periods, subjected to individuals who do not embody this specific sexual preference. It is therefore probable that other factors also play an important role in the development of these preferences.

Nature/Nurture and the Innate/Acquired Together Complete the Final Result of Human Sexuality

To a great extent, innate and universal human-specific traits are particular signs of attractiveness (in both genders) that signify genetic quality and fertility. There are such signs of attractiveness in which people from all cultures across history, even across age categories, agree on (e.g., face symmetry). Perceiving these universal signs is mainly genetically conditioned (even newborns automatically give them their increased attention), though it calibrates during their lifetime. Some parts of sexual behavior seem to have a strong innate part, e.g., copulatory pelvic thrusts are already present at a young age (Yang et al. 2005). In human behavioral displays, however, it is rarely the case that it would emerge automatically without being activated by an important stimuli, which must come from an environment (or fantasy). Contact with the demanded stimuli is mostly necessary in order to activate the adaptive strategy in a given sensitive period of ontogenetic development. These are seen as relatively long developmental periods in the individual's development when the nervous system is ready to increasingly react to specific stimuli from an environment that activates the occurrence of a given behavior. According to the neurodevelopmental sexual trajectories of Pfaus et al. (2012), there exist a few basic sensitive developmental periods in which the basic form of sexual (and partnership) life is constructed and in which we learn *who* will sexually attract us, *with whom* we will want to form a partnership, and *what activities* will bring us the biggest sexual pleasure.

Our sexuality is gradually shaped in these sensitive periods, starting with the consolidation of strongly innate sexual orientation and gender differentiation by creating preferences to/aversions toward sexual partners similar to the preferences/aversions of the people surrounding us (primary family), all the way to forming strong individual preferences for characteristics of a sexual partner, objects, or favorite sexual activities. This formation mainly takes place through experiences with sexual arousal and reward, meaning pleasurable feelings derived from arousal and orgasmic experience. The chosen behavioral displays continue to be reinforced by positive or negative experience during the following development stages (Pfaus et al. 2012), and according to recent theories and knowledge on brain neuroplasticity, these displays are fine-tuned throughout their life (Doidge 2007).

This long journey toward an individual's sexual "maturity" suggests huge variability and flexibility in the forming effects of experience and environment. Within the scope of innate variability, individuals differ precisely in this flexibility. Genetic predispositions to various paraphilias evidently determine how much an individual is genetically predisposed to internalize unusual objects into their SMS (e.g., in fetishism). Similarly, genetic components can determine the length of the sensitive period and the degree of SMS rigidity toward transcripts based on later sexual experiences. For one person, a fetish can be the only and necessarily demanded object for inducing sexual excitement, whereas for another, its usage by a partner only increases attractiveness and sexual arousal.

The Importance of the Phylogenetic History of Sexual Behavior, Variation, or Disorder

It is important to take into account the phylogenetic history of behavior, variations, or deviations, which, in practice, means to assess whether the

given element appears in other (close and also far related) species and in what frequency. The systems clearly linked to reproduction are very basal and are driven by ancient (in terms of phylogenesis) parts of the brain. The systems related to hierarchies appear in species with growing social groups. The systems and adaptations, which concern the creation of deeper dyadic links, whether between partners or between caregiver (parent) and offspring, are then rather young and inclined to changes in environment and mutations (Stevens and Price 2016). All of these systems use an identical arsenal of neural mechanisms linked to motivation and perception of reward. For example, according to evolutionary psychiatry, sadomasochism has its origins in the linkage of two phylogenetically ancient adaptive systems – reproduction and social hierarchy. They joint to be a part of a specific sexual strategy losing its original function and together provide a reward in the form of sexual satisfaction. The key events in sensitive childhood periods (e.g., physical punishments or abuse during adolescence) may activate both these systems simultaneously. This association via conditioning consequently strengthens the preferred sexual strategy and begins to produce sadomasochistic fantasies and motivate similarly tuned behavior. It is probable, however, that some people are more genetically predisposed than others for this bonding (Stevens and Price 2016). The results of intercultural studies focused on sadomasochistic practices indirectly support this theory. These practices often have a strongly ritualized form that obviously copies phylogenetically ancient forms of ritualized pain-inflicting behavior already present in lower vertebrates (Stevens and Price 2016). This genetically affected behavior helps establish social hierarchy and sustain differences between dominant and submissive individuals, consisting in signal use designed to increase one individual's status and reduce that of a submissive. The repertoire of signals differs between species, but it is possible to isolate universal patterns in them. Dominance across species is indicated by erecting one's posture and looking at the rival directly, while in contrast, the submissive will crouch and avoid eye contact (Darwin et al. 1998). Escalating signals during hierarchal battles include using physical strength and causing the opponent pain. In terms of human sadomasochistic activities, this sequence is also kept – the dominant figure emphasizes his supremacy through signs of social status, power, or physical size (uniforms, heels), begins a ritual of verbal aggression (degrading comments), threatens and intimidates, and even commits physical punishments and inflicts pain, with gradual intensification (Kamel 1980).

Zillmann and Bryant (1984) describe how the connection between hierarchal and sexual systems can mechanically occur within the framework of the *excitement shift* theory. According to which, the connection is possible because, on the sympathetic nervous system activation level, the activity is not linked to aggression or distinguished by fear and sex, and within the scope of sex play the two systems can *help each other* in escalating physical arousal. It seems that it is not only a case of hierarchal systems but any emotion from so-called *agonistic systems* to which classical ethology classifies aggression, dominance, and power, as well as submissiveness, fear, and flight. Dominance and submissiveness and aggression and fear are then two sides of the same coin, which, hand in hand, can be used even in the sexual context. The connection between these systems is strengthened, thanks to the secretion of endogenic opiate endorphins, which are released as a reaction to a threatening stimulation (pain, fear), reducing the intensity of physical and mental pain and increasing the feeling of satisfaction. In combination with sexual arousal, it can multiply the submissive's postcoital satisfaction. This theory, though, does not explain why most sadomasochists describe the occurrence of sadomasochistic fantasies unambiguously preceding realistic experiences with these activities. It therefore seems that the described linking can occur beyond being mediated, through imagining psychic pain or causing pain.

Another example can be pedophilia (Seto 2008). For diagnosing pedophilia, constant sexual interest in prepubescent children is pivotal, being expressed for at least 6 months through fantasies, desires, sexual arousal, or behavior and causing the investigated persona distress. The most cogent

symptom is falling in love with a child object. As in the case of sadomasochism, the evolutionary explanation behind the origin of pedophilia refers to the fusion of two evolutionarily ancient adaptive systems – reproduction and nurturing. Money (1990) states that a pedophile's relationship to a child qualitatively, and also neurologically, resembles a blend between parental and erotic love. Likewise, it can be linked to the close cohesion between these two systems that can be observed also between phylogenetically close species. For example, baboons create coalitions between young males and sexually immature females, even though the males behave sexually toward them only after they have reached sexual maturity. The founder of the human ethnology field, Irenäus Eibl-Eibesfeldt (1973), directly warns about the type of affiliative-erotic relationship that connects to the composition of long-term partnership, which was developed both in mammals and birds together with nurturing behavior, and therefore it is not surprising that they are occasionally mixed in humans. This explanation corresponds with the ethological viewpoint; therefore, it is a case of dysfunctional interaction and preference of nonverbal behavior that is typical for children, not of the pedophile's primary preference of a child's bodily figure. It is however unquestionable that treated pedophiles react with penile arousal also when seeing static pictures of child objects.

Conversely, Quinsey and Lalumiere (1995) presume that the emergence of pedophilia is related to the displaced mechanism of sexual preference. According to them, the male sexual preference system is one of complex modules that is often tuned to such characteristics that are important mainly when selecting a partner. These modules are relatively independent from each other and serve to detect the object's gender and his age (youth), body shape (mainly waist-hips ratio), and health. Furthermore, the authors claim that there is a failure of the module detecting and evaluating body shape, which causes the module for distinguishing age to malfunction. This claim is supported also by the fact that in opposition to non-pedophilic men, there is a higher percentage representation of homosexual and bisexual individuals among pedophiles, i.e., individuals who prefer the male figure, whose shape (waist-hips ratio) resembles prepubescent individuals (Quinsey and Lalumiere 1995).

The child's adaptive behavioral function to demand nurture from adults and his prospective urge to perform sexual activities is not mentioned too often. Still, it is a rather widespread behavior across cultures and historical periods that can help the child receive extra resources not available from their own parents. It would therefore be a complementary strategy – from the pedophile's side, there is the eroticization of nurturing behavior and attraction to signalization that encourages caretaking, whereas from the child's side, it is a functional, environmentally conditioned strategy that brings benefits in the form of resources and possibly even acquisition of sexual experience and calibration of child sexuality (Stevens and Price 2016). It is then interesting that such a large percentage of the common population associates behavior of providing care and signaling need with erotic charge, attaching sexual practices and fantasy scenarios to them (e.g., schoolgirl and teacher).

From an evolutionary perceptive, of course, there are differences between pedophilia and the so-called hebephilia (sexual attraction to pubescent children between 11 and 14) and ephebophilia (sexual attraction to adolescents between 15 and 19, Blanchard et al. 2009). Despite the unacceptable nature of pedophilia, it is necessary to note that pictures of partially developed pubertal naked girls can create arousal in non-pedophilic heterosexual males (Blanchard et al. 2009). From an evolutionary perspective of men's reproductive success, it would be illogical to avoid female objects already able to reproduce, even though the strongest arousal is present with women around 25 years old. The occasional pairing with pubescent girls can therefore fall into the spectrum of normal variability in heterosexual preferences.

Conclusion

The evolutionary approach allows one to look at disorders of sexual preference as adaptive

behavioral strategies, which have an innate element. It also suggests that the most important specifically human adaptation is the ability to modify one's sexual preference in relation to their environment, society, and culture. This carries, to an extent, the ability to change the adapted or, in critical periods, taught aspects of sexual scenarios even in later life, even if these changes are within inherited predispositions. The approach facilitates the distinguishing between parts of a sexually motivated system that are rigid to modification (and have a strong inherited component and ancient phylogenetic origin) and parts of a sexually motivated system dependent on environment and experiential influences. An emphasis on ontogenetic development and the concept of genetically programmed sensitive periods allow key factors for the forming of sexuality described in earlier psychology literature of different paradigmatic settings to be taken into account (e.g., repeated formulas of sexual abuse, physical punishments during childhood).

Cross-References

- ▶ Aggression for Sexual Access
- ▶ Paraphilia
- ▶ Sexual Abuse
- ▶ Sexual Coercion and Rape

References

Aronsson, H. (2011). Sexual imprinting and fetishism: An evolutionary hypothesis. In P. R. Adriaens & A. De Block (Eds.), *Maladapting minds: Philosophy, psychiatry, and evolutionary theory* (pp. 65–90). New York: Oxford University Press.

Beach, F. A. (1976). Sexual attractivity, proceptivity, and receptivity in female mammals. *Hormones and Behavior, 7*(1), 105–138.

Blanchard, R., Lykins, A. D., Wherrett, D., Kuban, M. E., Cantor, J. M., Blak, T., Dickey, R., & Klassen, P. E. (2009). Pedophilia, hebephilia, and the DSM-V. *Archives of Sexual Behavior, 38*(3), 335–350.

Darwin, C., Ekman, P., & Prodger, P. (1998). *The expression of the emotions in man and animals*. New York: Oxford University Press.

Diamond, M. (1993). Homosexuality and bisexuality in different populations. *Archives of Sexual Behavior, 22*(4), 291–310.

Dixson, A. F. (1998). *Primate sexuality: Comparative studies of the prosimians, monkeys, apes, and human beings*. New York: Oxford University Press.

Doidge, N. (2007). *The brain that changes itself: Stories of personal triumph from the frontiers of brain science*. New York: Penguin.

Eibl-Eibesfeldt, I. (1973). *Love and hate: On the natural history of basic behavior patterns*. Chivago: Aldine Transaction.

Freund, K. (1990). Courtship disorder. In W. L. Marshall, D. R. Laws, & H. E. Barbaree (Eds.), *Handbook of sexual assault: Issues, theories, and treatment of the offender* (pp. 195–205). New York: Springer.

Freund, K., & Blanchard, R. (1993). Erotic target location errors in male gender dysphorics, paedophiles, and fetishists. *The British Journal of Psychiatry, 162*, 558–563.

Gangestad, S. W., & Simpson, J. A. (2000). The evolution of human mating: Trade-offs and strategic pluralism. *Behavioral and Brain Sciences, 23*(04), 573–587.

Hite-Corrie, C. (2012). Intimate partner sexual violence: A review of current literature and consideration of possible future research directions. www.aphroditewounded.org. Accessed 31 May 2012.

Kamel, G. L. (1980). Leathersex: Meaningful aspects of gay sadomasochism. *Deviant Behavior, 1*(2), 171–191.

Klapilová, K., Androvičová, R., Bártová, K., Binter, J., Krejčová, L., Lindová, J., Průšová, D., Wells, T., Zikánová, T., & Valentova, J. V. (2016). (R)evoluce ve výzkumu lidské sexuality. In J. Horáček, L. Kesner, C. Höschl, F. Španiel, et al. (Eds.), *Mozek a jeho člověk, mysl a její nemoc* (pp. 117–129). Praha: Galén, Praha.

Långström, N., & Seto, M. C. (2006). Exhibitionistic and voyeuristic behavior in a Swedish national population survey. *Archives of Sexual Behavior, 35*(4), 427–435.

Laws, D. R., & O'Donohue, W. T. (Eds.). (2008). *Sexual deviance: Theory, assessment, and treatment*. New York: Guilford Press.

Madlafousek, J., Žantovský, M., Hliňák, Z., & Kolářský, A. (1981). Sexual behavior as a communicative process by which the system of partial motivational states is executed. *Ceskoslovenská Psychiatrie, 77*, 377–384.

Mohnke, S., Müller, S., Amelung, T., Krüger, T. H., Ponseti, J., Schiffer, B., Walter, M., Beier, K. M., & Walter, H. (2014). Brain alterations in pedophilia: A critical review. *Progress in Neurobiology, 122*, 1–23.

Money, J. (1986). *Lovemaps: Clinical concepts of sexual/erotic health and pathology, paraphilia, and gender*

transposition of childhood, adolescence, and maturity. New York: Ardent Media.

Money, J. (1990). *Pedophilia: A specific instance of new phylism theory as applied to paraphilic lovemaps* (pp. 445–463). New York: Springer.

Nesse, R. M. (2002). Evolutionary biology a basic science for psychiatry. *Official Journal of the Word Psychiatric Association., 1*(1), 7–9.

Pfaus, J. G., Kippin, T. E., Coria-Avila, G. A., Gelez, H., Afonso, V. M., Ismail, N., & Parada, M. (2012). Who, what, where, when (and maybe even why)? How the experience of sexual reward connects sexual desire, preference, and performance. *Archives of Sexual Behavior, 41*(1), 31–62.

Quinsey, V. L., & Lalumiere, M. L. (1995). Evolutionary perspectives on sexual offending. *Sexual Abuse: A Journal of Research and Treatment, 7*(4), 301–315.

Seto, M. C. (2008). *Pedophilia and sexual offending against children: Theory, assessment, and intervention*. Washington, DC: American Psychological Association.

Stevens, A., & Price, J. (2016). *Evolutionary psychiatry: A new beginning*. Routledge: Psychologic Press.

Suschinsky, K. D., & Lalumière, M. L. (2011). Prepared for anything? An investigation of female genital arousal in response to rape cues. *Psychological Science, 22*(2), 159–165.

Thornhill, R., & Gangestad, S. W. (1996). The evolution of human sexuality. *Trends in Ecology & Evolution, 11*(2), 98–102.

Yang, M. L., Fullwood, E., Goldstein, J., & Mink, J. W. (2005). Masturbation in infancy and early childhood presenting as a movement disorder: 12 cases and a review of the literature. *Pediatrics, 116*(6), 1427–1432.

Zillmann, D., & Bryant, J. (1984). Effects of massive exposure to pornography. In N. M. Malamuth & E. Donnerstein (Eds.), *Pornography and sexual aggression* (pp. 115–138). New York: Academic Press.

Kapitola III

Bártová, K., Androvičová, R., Krejčová, L., Weiss, P., & Klapilová, K. (2020). The prevalence of paraphilic interests in the Czech population: preference, arousal, the use of pornography, fantasy, and behavior. *The Journal of Sex Research*, 1-11. DOI: 10.1080/00224499.2019.1707468

The Journal of Sex Research

ISSN: 0022-4499 (Print) 1559-8519 (Online) Journal homepage: https://www.tandfonline.com/loi/hjsr20

The Prevalence of Paraphilic Interests in the Czech Population: Preference, Arousal, the Use of Pornography, Fantasy, and Behavior

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To cite this article: Klára Bártová, Renáta Androvičová, Lucie Krejčová, Petr Weiss & Kateřina Klapilová (2020): The Prevalence of Paraphilic Interests in the Czech Population: Preference, Arousal, the Use of Pornography, Fantasy, and Behavior, The Journal of Sex Research, DOI: 10.1080/00224499.2019.1707468

To link to this article: https://doi.org/10.1080/00224499.2019.1707468

THE JOURNAL OF SEX RESEARCH
https://doi.org/10.1080/00224499.2019.1707468

The Prevalence of Paraphilic Interests in the Czech Population: Preference, Arousal, the Use of Pornography, Fantasy, and Behavior

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ABSTRACT

The number of population-based studies focused on the prevalence of paraphilic sexual interests in men is very low and for women, the subject remains largely unexplored. The two main aims of this study are to investigate the prevalence of paraphilias and to explore sex differences in an online representative sample of Czech men and women using various dimensions of sexual experience. We collected data about sexual motivations and behavior from a representative online sample of 10,044 Czechs (5,023 men and 5,021 women). In a standardized online interview, participants answered questions about selected dimensions of sexual experience within specific paraphilic patterns: sexual preferences, sexual arousal, sexual fantasies in the past 6 months, pornography use in the past 6 months, and experience with paraphilic behaviors. Our results show that 31.3% of men (n = 1,571) and 13.6% of women (n = 683) admitted to at least one paraphilic preference. Moreover, 15.5% of men and 5% of women reported more than one paraphilic preference. Except for beating/torture and humiliation/submission, in terms of real experience with such behaviors almost all paraphilias were more common among men than among women. Our results indicate that the high prevalence of some paraphilic patterns might render their pathologization problematic.

Introduction

Prevalence of Paraphilic Interests across Populations

According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5, American Psychiatric Association [APA], 2013), a paraphilic interest can be defined as sexual interest in an anomalous target or activity. If this interest is present for 6 months or more, and equal or superior to "normophilic" interest for the achievement of sexual pleasure, it is considered to be a paraphilia. If it causes significant distress or disrupts sexual functioning, it is classified as a paraphilic disorder. Paraphilia, as represented by recurrent, intense, sexually arousing fantasies, sexual urges, or behaviors, tends to involve i) nonhuman objects (for instance, in fetishism or zoophilia), ii) suffering or humiliation of oneself or one's partner (for instance, in sadism or masochism), or iii) minors (for example, pedophilia). In this respect, it should be noted that ICD 11, which will come into effect in 2022, removes sadomasochism, fetishism, and transvestism from its list of paraphilic disorders. This decision was based on suggestions of the ICD 11 working group (Krueger et al., 2017; Reed et al., 2016). In comparison to DSM-5, ICD 11 uses absence of consent (regardless of the age of victim) as the core feature of paraphilic disorders, which implies that some instances of rape can be classified as manifestations of a paraphilic disorder. Consensual or solitary behaviors can be viewed as paraphilic disorders only if they cause substantial distress or pose a direct risk of injury or death to the individual concerned.

Current knowledge of distribution of paraphilic interests and paraphilias in the general population is biased because the majority of evidence is based on small samples of psychiatric patients, criminal individuals, or case studies (Behrendt, Buhl, & Seidl, 2002; Dunsieth et al., 2004; Federoff, Fishell, & Fedoroff, 1999; Kafka, 2012; Marsh et al., 2010). In sex offenders, for example, paraphilias were found in 25–74% of cases (Dunsieth et al., 2004; Hanson & Morton-Bourgon, 2004; Raymond, Coleman, Ohlerking, Christenson, & Miner, 1999) and that figure includes only individuals who were actually diagnosed with a paraphilic disorder. It is most likely, however, that in general nonclinical populations the prevalence of paraphilias is significantly lower (Långström & Seto, 2006; Marsh et al., 2010; Seto, 2008).

As noted above, awareness of paraphilias in the general population is limited. Nevertheless, recent calls for expansion of our knowledge of this subject, which come both from scholars (Briken & Krueger, 2018; Joyal, 2018) and from public institutions engaged in the management of sexual violence and/or its prevention (e.g., Rape, Abuse, and Incest National Network [RAINN], National Sexual Assault Online Hotline [NSAOH; www.rainn.org]), may soon result in more focus on these issues.

Current knowledge of paraphilic interests in nonclinical samples is based on just a few studies of varying quality.

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The main limitations of our knowledge of the subject are due to three main factors: First of all, there is a lack of population-based representative studies. Secondly, there is little interest in dimensions of paraphilic experience other than just behavior (such as paraphilic desires, fantasies, or self-reported paraphilic preferences). Thirdly, there is a near-absence of studies addressing paraphilic interests in women, so that the prevalence of paraphilic interests in women is largely unknown. And finally, there is a lack of representative studies investigating paraphilic interests in both sexes.

Studies across the world agree on identifying voyeurism and fetishism as the most frequent paraphilic patterns, followed by pedophilia, exhibitionism, frotteurism, and transvestism, as manifested by daydreaming, fantasy, porn use, or actual behavior (Abdullahi, Jafojo, & Udofia, 2015; Ahlers et al., 2011; Långström & Seto, 2006; Långström & Zucker, 2005; Oliveira Júnior & Abdo, 2010). In the realm of actual behavior in men, 7–18% admit to voyeurism, 2–25% to fetishism, 2–4% to exhibitionism, 2.5% to frotteurism, and up to 3% admit to transvestism (Abdullahi et al., 2015; Ahlers et al., 2011; Långström & Seto, 2006; Långström & Zucker, 2005; Oliveira Júnior & Abdo, 2010). It should be noted that percentages for voyeurism and fetishism vary greatly, thus raising the possibility of cultural influences which influence subjects' willingness to admit to such behaviors.

Unsurprisingly, in the realm of daydreams or masturbation fantasies, numbers are much higher. This could be explained by socially imposed restrictions on behaviors, but one should also take into account that the link between fantasy and behavior need not be quite straightforward, as noted for instance by Joyal, Cossette, and Lapierre (2015). For example, a large German survey of 1,915 men aged 40–79 years (Ahlers et al., 2011) had shown rather high percentages for voyeuristic (34.9%), fetishistic (30.0%), and sadistic (21.8%) sexual daydreams. Less common were fantasies of the exhibitionistic (3.5%) or transvestic, eventually fetishistic kind (4.9%), while other types of fantasies (such as sex with babies, sex with elderly persons, and zoophilic sex) were all reported jointly in the low prevalence category (6.3%). The most common masturbation fantasies included fetishism (26.4%), voyeurism (24.5%) and sadism (19.9%), while masturbation fantasies involving pedophilia (6.0%), transvestic fetishism (5.7%) and exhibitionism (3.3%) were less prevalent.

Interestingly, Joyal and Carpentier (2017), in their recent study based on an online Canadian sample of 475 men and 565 women, reported considerably higher percentages of voyeurism, exhibitionism, and frotteurism than other comparable studies. In their study, over 50% of men and 21.2% of women admitted to engaging in voyeuristic behavior at least once in their lifetime, while 32.6% of men and 29.4% of women reported exhibitionistic behavior, and 32.4% of men and 20.5% of women reported at least one occasion at which they engaged in frotteuristic behavior (Joyal & Carpentier, 2017). These results markedly differ from other reports, but this study was large and its representativeness was confirmed by parallel data collection via telephone.

Pedophilia, the most socially exposed unusual sexual pattern, seems to be also one of the rarest ones. In relatively recent studies, only up to 3.8% of men admitted to pedophilic interests (Dombert et al., 2016; Mohnke et al., 2014; Santtila et al., 2010) and less than 3% of women admitted to fantasies about prepubescent and pubescent children (Fromuth & Conn, 1997); 0.2% of men and 0.8% of women indicated actual engagement in pedophilic behavior (Abdullahi et al., 2015). Some likelihood of having sex with a child if there was no punishment was indicated by 6% of men and 2% of women, while 9% of men and 3% of women indicated that under such circumstances, they might view child pornography (Wurtele, Simons, & Moreno, 2014). It should be noted, though, that in comparison to other studies these results are based on a rather small sample.

Interestingly, Bondage-Discipline-Sado-Masochism-related activities (BDSM) seem to deviate from this pattern of behaviors which are characterized by a close link between the prevalence of fantasy and behavior. It has been observed that BDSM is very common on the level of fantasy but markedly less common on the level of actual behavior. National surveys showed that the prevalence of experience with BDSM in men and women combined was 10% in the USA and 1.7% in Australia (reviewed in Van Der Walt, 2014). Sexual fantasies involving BDSM, however, seem very common, reaching around 60% (Powls & Davies, 2012). This is in line with at least three other studies, which showed that paraphilic fantasies and especially fantasies focused on BDSM are indeed common in the general population (Holvoet et al., 2017; Joyal et al., 2015; Zurbriggen & Yost, 2004).

The abovementioned studies all seem to indicate that the prevalence of non-normophilic sexual patterns across multiple dimensions is higher in men than in women. In some particular instances, one can observe a curious reversal of the ratio (such as frotteurism and pedophilia in a Nigerian study involving undergraduate students by Abdullahi et al., 2015), but generally speaking, this is the rule. The only notable and well-confirmed exception to this rule is sexual masochism, which seems to be more widespread in women both on the level of behavior and on the level of fantasy. Some evidence even suggests that masochistic scenarios may be the most common paraphilic subject of sexual fantasies in women (Breslow, Evans, & Langley, 1985; Levitt, Moser, & Jamison, 1994). It is also well known that women often report sexual fantasies about sexual submissiveness or even about being forced into sexual behavior (Critelli & Bivona, 2008).

Reasons which underlie these sex differences are unclear, since existing information is based mostly on clinical experience (and the number of paraphilic women in specialized care for committing a sex-related offense is minimal), and the subject is not sufficiently explored (Dawson, Bannerman, & Lalumière, 2016). Theoretical explanations tend to focus on various factors which influence sexual behaviors, such as men's higher susceptibility to developmental disturbances which may contribute to the development of pathologies (Cantor, 2012), their generally higher sex drive (Dawson et al., 2016), higher mating efforts (Baumeister, Catanese, & Vohs, 2001), but also higher impulsivity and higher proclivity to sensation-seeking and risk-taking behaviors (Marshall, 2007).

The Aims of the Present Study

Large differences between the prevalence of paraphilic interests reported by various studies as well as differences in the

variables used as indicators of paraphilic interests raise concerns about the validity of results obtained by nonsystematic surveys. Researchers across the field strongly agree that there is an urgent need for epidemiological data which would assess various dimensions of sexual experience (self-reported preference, presence of thoughts and fantasies, arousal potential of paraphilic topics, and actual presence of paraphilic behavior) and that there are not enough studies of large representative samples outside clinical or correctional settings (Joyal & Carpentier, 2017; Laws & O'Donohue, 2008). Moreover, cultural and sex differences in the prevalence of paraphilic interests should also be investigated to determine the role of biological sex and social and cultural influences on the phenomenon. A better understanding of the distribution of paraphilic interests in populations may also help individuals who need specialized treatment or preventive support.

The main aims of the present study thus were: Firstly, to describe the prevalence of paraphilic sexual interests (and paraphilias) in a representative online sample of Czech men and women using questions which target various dimensions of sexual experience. This study adds to previous studies by exploring a wide range of dimensions of sexual experience, not only behavior or arousal. Secondly, we wanted to assess, based on the above, sex differences in the prevalence of paraphilic sexual interests and paraphilias. Based on previous literature, we hypothesized that with the exception of the behavioral dimension of paraphilic patterns related to BDSM (specifically beating/torture, humiliation/submission), the percentage of persons reporting paraphilias across all dimensions of sexual experience should be significantly higher in men. And finally, we wanted to explore associations between the various dimensions of sexual experience.

Method

Sample and Procedure

Participants were recruited from a national pool of Czech respondents via STEM/MARK sociodemographic agency (www.stemmark.cz) in December 2016. This agency recruits from the European national panel (https://www.nationalpanel.eu/). The panel is compliant with the ethical codex of ICCP/ESOMAR (https://www.esomar.org/). Stratified random sampling was applied (the quotas were Czech nationality, the region of the Czech Republic, number of inhabitants in place of residence, sex, age, and education). Quotas were determined based on the last census of the Czech Statistical Agency in 2011 (Český statistický úřad, 2013). Data were collected using a standardized online interview in the form of an online questionnaire. An online method (instead of telephone or face to face interviewing) was selected due to the intimate character of our questions. From a national register of 50,000 men and women, a total of 12,000 men and 13,500 women were randomly selected within the particular quotas. These persons were then contacted by e-mail and invited to participate in an online survey. If they agreed to participation (men = 7,109, i.e., 59%; women = 6,903, i.e., 51%), they were asked to log in and complete our online questionnaire. Data of 2,086 men and 1,882 women were not included either because they did not complete the questionnaire or due to saturation of particular quotas. The final online representative sample consisted of 5,023 men (age range: 18–88 years, *M* age = 45.47; SD = 15.47); 53% of men completed elementary education, almost 31% had higher education, and 16.2% attended university; 95% identified as heterosexual, 1.9% as bisexual, and 3.1% as homosexual. We also collected data from 5,021 women (age range: 18–88 years; *M* age = 46.13; SD = 15.32); 48.3% of women completed elementary education, 37% had higher education, and 14.7% of women attended university; 97.5% identified as heterosexual, 2% as bisexual, and 0.5% as homosexual. This research was approved by the Ethics Committee of National Institute of Mental Health (n. 119/19).

Instruments and Methods

Before providing information in the online data survey, each participant provided informed consent. Completion of the questionnaire took on average 18 min. The questionnaire was available only in Czech.

The first part of the questionnaire focused on basic sociodemographic data such as sex, age, sexual orientation, level of education, and place of residence. Sexual orientation was assessed on a 7-point Kinsey scale (ranging from 0 = "exclusively heterosexual" to 6 = "exclusively homosexual"; Kinsey, Pomeroy, Martin, & Gebhard, 1998). The second part of the questionnaire focused on the prevalence of 13 paraphilic sexual interests, namely voyeurism, frotteurism/toucherism, fetishism, fetishistic transvestitism, exhibitionism, humiliation/submission, beating/torture, autogynephilia/autoandrophilia[1], immobilization, pedophilia, zoophilia, and biastophilia (in the Czech sexological tradition known as "pathological sexual aggression"). The paraphilic interests section included seven sexual preference disorders listed in the ICD 10. We also included several additional items on frotteurism/toucherism, hebephilia, zoophilia, autogynephilia/autoandrophilia, immobilization, and biastophilia (see Table 1; World Health Organization, 1993). Descriptions of sexual interests presented to survey participants were based on definitions used in the diagnostic manual (e.g., Toucherism/frotteurisms: Secret touching or rubbing against intimate parts of an unknown person to obtain sexual arousal) and the assessed dimensions of sexual experience were congruent with diagnostic criteria. Using 5-point and 9-point scales, we assessed the following dimensions of sexual experience:

(1) PREFERENCE: Do you have such a preference?
1 (Not at all) 2 3 4 5 (Definitely yes)
(2) AROUSAL: How sexually arousing would you find it?
1 (It is unpleasant to think about it) 2 3 4 5 (Highly arousing)
(3) PORN USE: How often did you watch/read erotic materials with this kind of content in the past 6 months? (videos, stories, etc.)

[1]The diagnosis of autogynephilia is traditionally reserved for men; to ask for an analogous sexual experience in women (autoandrophilia), we used a different wording: *"You are sexually aroused by the thought of being a man."*

Table 1. Names and definitions of paraphilic patterns in the questionnaire used and corresponding diagnoses according to the ICD 10 (World Health Organization, 1993).

Name	Description of paraphilic pattern presented to participants	Corresponding diagnosis in ICD-10
Fetishism	Preference for fetish (reliance on an inanimate object as a stimulus of sexual arousal and sexual gratification, e.g. latex, leather, rubber, shoes, underwear …).	Fetishism (F65.0)
Transvestitism	The wearing of clothes of the opposite sex to obtain sexual arousal.	Fetishistic transvestitism (F65.1)
Exhibitionism	Exposing one's genitalia to unknown men/women (in non-intimate situations) to obtain sexual arousal.	Exhibitionism (F65.2)
Voyeurism	Secret watching of intimate activities of other people (e.g. undressing, sexual activities) to obtain sexual arousal.	Voyeurism (F65.3)
Pedophilia	Intimate contact with prepubertal children.	Pedophilia (F65.4)
Hebephilia	Intimate contact with pubertal children.	NOS (F65.8)
Humiliation/ Submission	Preference for sadomasochistic sexual activity which involves physical or psychological humiliation or submission (either as recipient or as provider).	Sadomasochism (F65.5)
Beating/Torture	Preference for sadomasochistic sexual activity which involves pain by beating or other forms of torture (either as recipient or as provider).	Sadomasochism (F65.5)
Zoophilia	Sexual activities with animals.	NOS (F65.8)
Frotteurism/ Toucherism	Secret touching or rubbing against intimate parts of an unknown person to obtain sexual arousal.	NOS (F65.8)
Autogynephilia/ Autoandrophilia	Imagining being of the opposite sex to obtain sexual arousal.	NOS (F65.8)
Biastophilia	Non-consensual preying on unknown men/women and sexually assaulting them to obtain sexual arousal.	NOS (F65.8)
Immobilization	Non-consensual immobilization of unknown men/women (with or without use of violence) to obtain sexual arousal.	NOS (F65.8)

Not even once 1–2 times 3–6 times 7–25 times More frequently

(4) FANTASY: How often did you have fantasies corresponding to this preference in the past 6 months? *Never Very rarely Once a month Once a week Every day*

(5) BEHAVIOR: How many times in your life did you engage in such activities? *Never 1 2 3 4 5 6 times 7–9 times 10–19 times 20 and more*

Note that for illegal behaviors that may be included in biastophilia, immobilization, hebephilia, and pedophilia, this question was replaced by formulation: "Would you engage in such activity if it were legal in our society?"

1 (Certainly not) 2 3 4 5 (Definitely yes)

Finally, participants indicated if they ever had visited a sexologist or other health-care specialist in connection with their sexual preference (Yes/No).

Paraphilic Interest Versus Paraphilia

In each dimension (Preference, Arousal, Fantasy, Porn Use, Behavior), we identified the extent to which the unusual sexual preference or experience is present. Responses were divided into three categories: never occurs (answer "1"), paraphilic interest (the middle of each scale), and the presence of paraphilia (the last two points of each scale). This procedure was based on an approach previously employed by Joyal and Carpentier (2017), who argued that the uppermost part of the scale can be viewed as representing the range where intense and persistent paraphilic interest, i.e., paraphilia, manifests itself.

Statistical Analyses

All analyses were carried out in SPSS 21.0 (IBM Corp.). Prevalence rates were first obtained for the whole sample, then treated separately for men and women. Percentages for paraphilias and paraphilic interests are presented separately. Percentages of individuals with paraphilia who in the past visited a health-care professional are presented in a separate table. Sex differences in paraphilic interests/paraphilias were computed using chi-squares (Bonferroni corrected). The strength of links between all dimensions of sexual experience for each paraphilia was expressed using Kendall's correlation coefficients suitable for ordinal categorized variables, and internal consistency between the dimensions was assessed by Cronbach's α. Following Dawson et al. (2016), we treated only correlations with at least a medium effect size (r_τ = .30 or more) as significant.

Results

Prevalence of Paraphilia and Paraphilic Interests

Results showed that 31.3% of men (n = 1,571) and 13.6% of women (n = 683) admitted to at least one paraphilia (from our list of paraphilias) in the dimension of Preference. Moreover, 15.5% of men and 5% of women reported the presence of more than one paraphilia in the same dimension. Regarding the rating of the Arousal potential of the various paraphilias, 40.2% of men and 18.7% of women were highly excited by some paraphilic topics. A total of 21.1% of men and 5.1% of women reported the use of pornography with paraphilic content at least seven times in the past 6 months and 20.4% of men and 6.5% of women had paraphilic fantasies at least once a week over the past 6 months. Almost one quarter (23.3%) of men and 10.1% of women had engaged in a paraphilic behavior at least 10 times over their lifetime. For a detailed distribution of prevalence of different paraphilias in all dimensions, see Table 2.

The three most prevalent paraphilias in the Preference dimension were voyeurism (16.6% of men, and 6.4% of women), frotteurism/toucherism (12.7%, and 3.9%, respectively) and fetishism (10.1%, and 2.4%, respectively; see Table 3). In the dimension of Arousal, results were similar: voyeurism (23.3% of men, and 9.9% of women), frotteurism/toucherism (16.9%, and

Table 2. Cumulative prevalence (%) of paraphilias assessed for all dimensions of sexual experience (preference, arousal, porn use, fantasies, and behavior) in a representative online Czech sample of men (5,023) and women (5,021).

	Preference		Arousal		Porn use		Fantasies		Behavior	
Number of admitted paraphilias	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
0	68.7	86.4	59.8	81.3	78.9	94.9	79.6	93.5	76.7	89.9
1	15.8	8.6	18.6	10.7	11.1	2.5	11.6	3.9	15.3	7.3
2	8.0	2.8	10.1	4.3	4.1	1.3	4.3	1.8	5.1	1.9
3	3.5	1.4	5.7	2.2	2.6	.7	2.5	.5	2.1	.7
4	1.9	.5	2.9	.9	1.4	.2	.8	.2	.6	.1
5	.9	.2	1.1	.3	.7	.1	.5	.1	.1	<.1
6	.5	.1	.8	.2	.4	.1	.4	<.1	.1	<.1
7	.2	<.1	.4	<.1	.3	.1	.2	NC	<.1	NC
8	.2	NC	.3	.0	.2	NC	.1	.0	<.1	NC
9	.1	NC	.2	NC	.1	.0	<.1	NC	NC	NC
10	.1	NC	.1	NC	.1	<.1	.1	NC	NC	NC
11	NC	NC	<.1	<.1	<.1	<.1	<.1	NC	NC	NC
12	NC	NC	<.1	NC	<.1	NC	NC	NC	NC	NC
13	NC	NC	<.1	NC	.1	NC	<.1	NC	NC	NC

Only the last two points of each scale were considered as the presence of paraphilia; NC = no cases.

Table 3. The prevalence (%) of paraphilias, paraphilic interests, and no paraphilic interests in the dimension of preference and sex differences in the prevalence of paraphilias in the Czech population (5,023 men and 5,021 women; paraphilic patterns are presented in an alphabetical order).

	No paraphilic interest (1 Certainly not)			Paraphilic interest (2–3)			Paraphilia (4–5 definitely yes)			Sex difference in prevalence of the paraphilia			
Paraphilic pattern	Overall	Men	Women	Overall	Men	Women	Overall	Men	Women	χ^2	*P*	ES	CI (95%)
Autogynephilia/Autoandrophilia	92.4	90.4	94.3	6.4	7.9	4.9	1.2	1.7	0.8	19.47	<.001	.05	0.03–0.06
Beating/Torture	91.7	91.1	92.2	6.4	6.8	6.1	1.9	2.1	1.7	2.28	.145	.02	0.00–0.04
Biastophilia	94.7	92.2	97.2	4.3	6.1	2.4	1.0	1.7	0.4	42.73	<.001	.07	0.05–0.08
Exhibitionism	86.9	82.8	91.1	10.8	14.3	7.4	2.3	3.0	1.5	31.04	<.001	.06	0.04–0.08
Fetishism	75.5	64.0	87.0	**18.2**	**25.9**	10.6	6.3	10.1	2.4	343.43	<.001	.20	0.19–0.22
Frotteurism/Toucherism	68.4	56.3	80.5	**23.3**	**31.1**	15.3	8.3	12.7	3.9	372.33	<.001	.22	0.20–0.24
Hebephilia	90.9	83.2	98.6	7.5	13.7	1.3	1.6	3.1	0.1	NA	NA	NA	NA
Humiliation/Submission	88.1	86.4	89.7	9.0	10.0	8.0	2.9	3.5	2.3	15.44	<.001	.04	0.02–0.06
Immobilization	85.0	80.4	89.6	11.4	14.6	8.2	3.6	5.1	2.2	72.79	<.001	.09	0.07–0.11
Pedophilia	98.7	97.7	99.6	1.0	1.7	0.4	0.3	0.6	0	NA	NA	NA	NA
Transvestitism	95.6	93.5	97.7	3.7	5.4	2.0	0.7	1.1	0.3	26.73	<.001	.05	0.03–0.07
Voyeurism	54.3	40.8	67.7	**34.2**	**42.5**	**25.9**	11.5	**16.6**	6.4	466.57	<.001	.27	0.25–0.29
Zoophilia	97.1	96.0	98.1	2.4	3.2	1.7	0.5	0.8	0.2	19.31	<.001	.04	0.03–0.06

ES = effect size (Cramer's V); CI = confidence intervals; NA = not applicable, less than 5 instances. Bold font indicates rates higher than statistical criteria for unusual (15.9%) occurrence.

Table 4. The prevalence (%) of paraphilias, paraphilic interests, and no paraphilic interest in the dimension of arousal and sex differences in the prevalence of paraphilias in the Czech population (5,023 men and 5,021 women; paraphilic patterns are presented in alphabetical order).

	No paraphilic interest (1 "it is unpleasant to think about it")			Paraphilic interest (2–3)			Paraphilia (4–5 "highly arousing")			Sex difference in prevalence of the paraphilia			
Paraphilic pattern	Overall	Men	Women	Overall	Men	Women	Overall	Men	Women	χ^2	*p*	ES	CI (95%)
Autogynephilia/ Autoandrophilia	76.3	73.3	79.3	**22.1**	**24.4**	**19.8**	1.6	2.2.	0.9	32.62	<.001	.07	0.05–0.09
Beating/Torture	87.0	86.0	88.1	10.2	11.1	9.3	2.8	3.0	2.6	1.44	.249	.01	0.00–0.03
Biastophilia	88.7	84.4	93.0	9.8	13.4	6.3	1.4	2.2	0.6	52.39	<.001	.08	0.06–0.09
Exhibitionism	74.9	68.6	81.2	**21.8**	**27.2**	**16.5**	3.3	4.3	2.3	47.58	<.001	.08	0.06–0.10
Fetishism	51.7	41.0	62.4	**38.5**	**43.5**	**33.4**	9.8	15.4	4.2	506.80	<.001	.29	0.27–0.31
Frotteurism/Toucherism	50.2	34.8	65.7	**38.7**	**48.3**	**29.1**	11.0	**16.9**	5.1	661.76	<.001	.33	0.31–0.35
Hebephilia	85.3	74.1	96.6	12.4	**21.5**	3.3	2.3	4.4	0.1	263.11	<.001	.17	0.16–0.18
Humiliation/Submission	82.1	79.6	84.5	13.8	15.7	11.9	4.1	4.7	3.5	11.72	.001	.04	0.02–0.06
Immobilization	75.3	69.1	81.6	**20.0**	**24.4**	15.6	4.7	6.5	2.9	96.78	<.001	.11	0.09–0.13
Pedophilia	97.0	94.9	99.0	2.6	4.2	0.9	0.5	0.9	0.1	NA	NA	NA	NA
Transvestitism	73.3	72.5	74.2	**25.6**	**25.9**	**25.4**	1.0	1.6	0.5	34.03	<.001	.07	0.05–0.09
Voyeurism	39.2	26.8	51.7	**44.2**	**50.0**	**38.5**	**16.6**	**23.3**	9.9	617.92	<.001	.33	0.31–0.36
Zoophilia	93.8	91.9	95.7	5.6	7.1	4.0	0.7	1.0	0.3	18.80	<.001	.05	0.03–0.06

ES = effect size (Cramer's V); CI = confidence intervals; NA = not applicable, counts were less than 5.
Bold font indicates rates higher than statistical criteria for unusual occurrence (15.9%).

5.1%, respectively), and fetishism (15.4%, and 4.2%, respectively; see Table 4). The four types of paraphilic pornographic content most frequently watched by respondents in the past 6 months were fetishism (11.5% of men, and 1.7% of women), voyeurism (7.7%, and 1.6%, respectively), immobilization (4.5%, and 1.2%, respectively), and humiliation/submission (4.1%, and 1.7%, respectively; see Table 5). The highest prevalence for paraphilias in the dimension of Fantasy were fetishism (10.5% of men, and 2.0% of women) and voyeurism (7.1%, and 1.7%, respectively), followed by toucherism/frotteurism, where, however, it held only in the overall sample (3.7%) and in men (5.8%) and women were not represented. The third most common

Table 5. The prevalence (%) of paraphilias, paraphilic interests, and no paraphilic interests in the dimension of porn use over the past 6 months and sex differences in the prevalence of paraphilias in the Czech population (5,023 men and 5,021 women; paraphilic patterns are presented in alphabetical order).

	No paraphilic interest ("not at all")			Paraphilic interest (1 to 6 times)			Paraphilia (7 to 25 times or more)			Sex difference in prevalence of the paraphilia			
Paraphilic patterns	Overall	Men	Women	Overall	Men	Women	Overall	Men	Women	χ^2	*p*	ES	CI (95%)
Autogynephilia/ Autoandrophilia	95.9	94.5	97.4	3.4	4.4	2.5	0.6	1.1	0.2	34.18	<.001	.05	0.07–0.04
Beating/Torture	88.7	87.4	90.1	9.0	9.5	8.5	2.3	3.1	1.4	37.67	<.001	.06	0.05–0.08
Biastophilia	91.5	88.6	94.4	7.3	9.6	5.1	1.2	1.8	0.5	42.15	<.001	.07	0.05–0.08
Exhibitionism	89.2	87.5	90.8	9.3	10.3	8.3	1.5	2.2	0.9	29.91	<.001	.06	0.04–0.08
Fetishism	74.6	62.5	86.6	**18.9**	**26.0**	11.7	6.6	11.5	1.7	500.85	<.001	.25	0.23–0.26
Frotteurism/Toucherism	84.4	78.8	90.0	12.9	**16.8**	9.1	2.7	4.4	0.9	136.07	<.001	.13	0.11–0.14
Hebephilia	94.4	90.3	98.3	4.7	7.9	1.6	0.9	1.7	0.1	73.31	<.001	.09	0.07–0.10
Humiliation/Submission	85.9	83.2	88.5	11.2	12.7	9.8	2.9	4.1	1.7	57.54	<.001	.08	0.06–0.10
Immobilization	84.9	79.7	90.1	12.2	15.8	8.7	2.9	4.5	1.2	115.97	<.001	.12	0.10–0.13
Pedophilia	97.6	96.9	98.4	2.0	2.5	1.4	0.4	0.6	0.1	16.34	<.001	.04	0.02–0.06
Transvestitism	94.9	92.9	96.9	4.2	5.5	2.8	0.9	1.6	0.3	51.60	<.001	.07	0.06–0.09
Voyeurism	73.4	63.0	83.7	**22.0**	**29.2**	14.7	4.7	7.7	1.6	286.41	<.001	.19	0.17–0.21
Zoophilia	95.3	92.8	97.8	4.2	6.4	2.1	0.5	0.1	0.2	23.94	<.001	.05	0.03–0.07

ES = effect size (Cramer's V); CI = confidence intervals. Bold font indicates rates higher than statistical criteria for unusual occurrence (15.9%).

paraphilic fantasy content among women was humiliation/submission (1.6%; see Table 6). And finally, we found that 9.9% of men and 3.0% of women had repeated (more than 10 times over their lifetime) experience with fetishistic behavior, 8.9% of men and 2.9% of women had experience with toucheristic/frotteuristic behavior, and 8.3% of men and 2.2% of women had experience with voyeuristic behavior (see Table 7).

For detailed results of the distribution of paraphilic interests as well as of individuals in the general population who had no paraphilic interests, see Tables 3–7. The percentages of individuals affected with paraphilia, who confided in a health-care professional, were generally very low for all paraphilic patterns – ranging from 0% in pedophilia and hebephilia (women) to 14.7% in exhibitionism (men). Detailed percentages of individuals who confided in a health-care professional in connection with their sexual preferences can be found in Table 8.

Sex Differences

We tested the differences between men (n = 5,023) and women (n = 5,021) in the prevalence of paraphilias, i.e., for all paraphilic patterns and dimensions of sexual experience. Results showed significant sex differences in the prevalence of paraphilias in almost all dimensions and paraphilic patterns. As expected, men, in general, reported higher prevalences. In beating/torture (dimension of Preference, Arousal, and Behavior) and humiliation/submission (dimension of Behavior), we found no differences between the sexes. The effect sizes were, however, mostly negligible or weak, with only a few of a moderate size (Cohen, 1988; for detailed results, see Tables 3–7).

Correlations between the Dimensions of Sexual Experience

According to strict criteria, we applied (r_τ > .30 indicating medium and larger effect size; Cohen, 1988), almost all dimensions (namely Preference, Arousal, Porn Use, Fantasy, and Behavior) were in men significantly positively correlated for all paraphilic patterns, the only exceptions being Porn Use and the Behavior dimension in zoophilia (r_τ = .286; a low effect size). For detailed results, see Tables S1–S7 in supplementary materials. All Cronbach's α in men were above .82, indicating a high internal consistency across all tested dimensions.

In women, the dimensions were all significantly positively correlated in biastophilia, exhibitionism, fetishism, frotteurism/toucherism, immobilization, beating/torture, humiliation/

Table 6. The prevalence (%) of paraphilias, paraphilic interests, and no paraphilic interest in the dimension of fantasies over the past 6 months and sex differences in the prevalence of paraphilias in the Czech population (5,023 men and 5,021 women; paraphilic patterns are presented in alphabetical order).

	No paraphilic interest (never)			Paraphilic interest (very rarely – once a month)			Paraphilia (once a week – every day)			Sex difference in prevalence of the paraphilia			
Paraphilic patterns	Overall	Men	Women	Overall	Men	Women	Overall	Men	Women	χ^2	*p*	ES	CI (95%)
Autogynephilia/ Autoandrophilia	93.2	91.1	95.2	6.2	7.8	4.5	0.7	1.1	0.3	25.13	<.001	.05	0.03–0.07
Beating/Torture	91.4	90.8	92.0	7.0	7.2	6.7	1.6	1.9	1.3	6.60	.011	.03	0.06–0.05
Biastophilia	94.5	92.0	96.9	4.9	6.9	2.9	0.7	1.1	0.2	28.74	<.001	.06	0.04–0.07
Exhibitionism	87.8	84.0	91.6	10.8	13.8	7.7	1.4	2.2	0.7	46.75	<.001	.07	0.06–0.09
Fetishism	73.0	60.9	85.1	**20.8**	**28.7**	12.9	6.2	10.5	2.0	416.44	<.001	.23	0.21–0.25
Frotteurism/Toucherism	72.6	62.2	83.0	**23.7**	**32.0**	15.5	3.7	5.8	1.5	185.80	<.001	.16	0.14–0.17
Hebephilia	92.2	85.3	99.9	7.1	13.3	0.9	0.7	1.4	0	NA	NA	NA	NA
Humiliation/Submission	87.6	86.0	89.3	10.1	11.0	9.1	2.3	2.9	1.6	20.90	<.001	.05	0.03–0.07
Immobilization	85.9	81.5	90.3	12.3	15.7	8.9	1.8	2.8	0.8	67.42	<.001	.09	0.07–0.11
Pedophilia	98.5	97.4	99.6	1.3	2.2	0.4	0.2	0.4	0	NA	NA	NA	NA
Transvestitism	95.6	93.8	97.3	3.8	5.0	2.5	0.6	1.1	0.1	40.62	<.001	.07	0.05–0.08
Voyeurism	63.3	52.0	74.5	**32.4**	**40.9**	**23.8**	4.4	7.1	1.7	265.37	<.001	.20	0.18–0.22
Zoophilia	97.4	96.6	98.2	2.3	2.9	1.7	0.3	0.6	0.1	16.35	<.001	.04	0.02–0.06

ES = effect size (Cramer's V); CI = confidence intervals; NA = not applicable, less than 5 instances. Bold font indicates rates higher than statistical criteria for unusual occurrence (15.9%).

Table 7. The lifetime prevalence (%) of paraphilias, paraphilic interests, and no paraphilic interests in the dimension of behavior and sex differences in the prevalence of paraphilia in the Czech population (5,023 men and 5,021 women; paraphilic patterns are presented in an alphabetical order).

	No paraphilic interest (never/certainly not*)			Paraphilic interest (1 to 9 times/2 – 3*)			Paraphilia (10 to 19 times or 20 and more times/4 – 5 "definitely yes"**)			Sex difference in prevalence of the paraphilia			
Paraphilic patterns	Overall	Men	Women	Overall	Men	Women	Overall	Men	Women	χ^2	*p*	ES	CI (95%)
Autogynephilia/ Autoandrophilia	95.7	93.9	97.6	3.7	5.2	2.2	0.6	1.0	0.2	24.49	<.001	.05	0.03–0.07
Beating/Torture	93.1	93.6	92.6	5.2	4.9	5.5	1.7	1.6	1.9	2.24	.134	.02	0.01–0.04
Biastophilia*	94.0	91.0	97.1	4.8	6.8	2.7	1.2	2.2	0.3	80.80	<.001	.09	0.08–0.11
Exhibitionism	91.7	89.8	93.6	6.9	8.2	5.6	1.4	2.0	0.9	23.37	<.001	.05	0.03–0.07
Fetishism	79.3	71.8	86.7	14.2	**18.2**	10.2	6.5	9.9	3.0	235.99	<.001	.17	0.14–0.19
Frotteurism/Toucherism	73.1	63.2	83.1	**21.0**	**27.9**	14.0	5.9	8.9	2.9	227.68	<.001	.17	0.15–0.19
Hebephilia*	90.6	82.3	98.9	7.2	13.3	1.1	2.2	4.4	0	251.99	<.001	.16	0.15–0.18
Humiliation/Submission	91.5	91.6	91.4	6.4	6.2	6.5	2.1	2.2	2.1	.03	.856	.02	0.00–0.02
Immobilization*	83.1	77.9	88.2	13.5	**17.1**	9.8	3.5	5.0	1.9	85.17	<.001	.10	0.08–0.12
Pedophilia*	97.9	96.2	99.7	1.5	2.8	0.3	0.6	1.0	0.1	42.62	<.001	.07	0.05–0.08
Transvestitism	92.8	89.2	96.4	6.2	9.4	3.0	1.0	1.5	0.5	24.65	<.001	.05	0.04–0.07
Voyeurism	68.3	56.5	80.1	**26.4**	**35.2**	**17.7**	5.3	8.3	2.2	281.92	<.001	.20	0.18–0.22
Zoophilia	98.4	98.1	98.7	1.5	1.7	1.2	0.1	0.2	0.1	4.62	.032	.02	0.00–0.04

* = Indicates wish for engaging in such activity if it was legal.
ES = effect size (Cramer's V); CI = confidence intervals.
Bold font indicates rates higher than statistical criteria for unusual occurrence (15.9%).

Table 8. The prevalence (%) of respondents with paraphilia in the dimension of preference who confided in a health-care professional (e.g., sexologist).

	Paraphilia (4–5 certainly yes)		
Paraphilic pattern	Overall	Men	Women
Total Prevalence (presence of at least one paraphilia)	8.5	8.8	7.8
Autogynephilia/ Autoandrophilia	9.6	8.1	12.8
Beating/Torture	13.0	13.2	12.8
Biastophilia	9.2	10.8	0.0
Exhibitionism	11.5	14.7	5.3
Fetishism	10.8	10.6	11.5
Frotteurism/Toucherism	9.0	9.1	8.6
Hebephilia	11.3	11.5	0.0
Humiliation/Submission	10.9	11.8	9.6
Immobilization	10.8	13.0	5.6
Pedophilia	3.2	3.3	0.0
Transvestitism	11.9	13.0	7.7
Voyeurism	9.1	9.6	7.8
Zoophilia	12.5	12.8	11.1

submission, and voyeurism. Non-correlations between some dimensions were observed in autoandrophilia, hebephilia, pedophilia, transvestitism, and zoophilia (see Tables S1–S7 in supplementary materials). Cronbach's alphas were all higher than .70, with the exceptions of transvestism (α = .64) and pedophilia (α = .60).

Discussion

Following the main aims of this study, we collected data on the prevalence of paraphilic sexual interests and paraphilia in five dimensions of sexual experience using a large and representative online sample of Czech men and women (N = 10,044). We found a relatively high general prevalence of paraphilias in the population: 31.3% of men and 13.6% of women admitted preference for at least one paraphilia. The most prevalent paraphilic patterns across all dimensions (in both men and women) were voyeurism, frotteurism/toucherism, and fetishism. Their prevalence exceeded statistical criteria for rare (less than 2.3%) or unusual (less than 15.9%) population phenomena. Paraphilias and paraphilic interests including paraphilic objects (i.e., not phenotypically normal, physically mature, consenting human partners, as noted in the definition of paraphilia in DSM-5; APA, 2013) were uncommon, especially in women where their prevalence was close to zero. We also found that very few of the individuals who indicated a strong preference for some paraphilic pattern sought the help of health-care professionals.

In all dimensions, we confirmed a higher prevalence of paraphilias in men than in women, the only exception being paraphilic patterns related to BDSM practices such as beating/torture and humiliation/submission, which were in some dimensions more common in women. With the exception of differences in the most prevalent paraphilic patterns (voyeurism, frotteurism/toucherism, and fetishism), which reached moderate effect sizes, the effect sizes were either statistically negligible or low. Associations between the dimensions of sexual experience (Preference, Arousal, Fantasy, Porn Use, and Behavior) were all significant and of moderate or large effect sizes, with high internal consistency across dimensions in all paraphilias. This suggests that assessments of paraphilia and paraphilic interests should indeed treat all dimensions of sexual experience as relevant.

Our findings are in line with a recent study by Joyal and Carpentier (2017), especially with respect to the behavioral dimension of paraphilia ("I often behave in line with a paraphilic pattern"), the desire to engage in a paraphilic behavior ("I absolutely wish to experience …"), and regarding the dimension of Preference. Similar to Joyal and Carpentier (2017), the prevalence rates we found are higher than those found in older, mostly non-representative surveys undertaken in the 1990s or earlier (e.g., Janus & Janus, 1993). These surveys were conducted prior to the social change which led to a higher acceptance of unusual sexual preferences and prior to the cultural spread (via, e.g., popular literature) of unusual practices such as BDSM. This cultural shift took place mainly in recent decades (Peter & Valkenburg, 2006). We found a relatively high general prevalence of any paraphilia and especially in the case of voyeurism, fetishism, and toucherism/frotteurism (across all dimensions), the rates exceed statistical norms for being rare

or unusual. Earlier studies (e.g., Ahlers et al., 2011; Dawson et al., 2016; Joyal & Carpentier, 2017) have also demonstrated high prevalence of voyeurism, fetishism, frotteurism/toucherism, and sadism/masochism, which suggests that a priori labeling of these patterns as atypical or pathological may be at least problematic. However, high numbers of these patterns could also be false positives due to discrepancies in definitions of paraphilic patterns. For example, not all studies (including ours) clearly specify the potential victim as being unaware of the behavior in definition, which is key to acknowledge a pattern as paraphilic and is present in the ICD-10 definition (e.g., "carried out without the observed people being aware"). Another important factor is intentionality of voyeuristic or toucheristic/frotteuristic acts, which is rarely included in questionnaires and thus, behaviors which happened by chance are not always excluded from the behavioral dimension.

Based on these results, we would like to argue that one ought to make a strict distinction not only between paraphilic interests and paraphilias but also between paraphilias as variants of sexuality and paraphilic disorders that should be treated (and acknowledged by the DSM – 5). Moreover, in the light of a recent modification in the ICD 11, which removed sadomasochism, fetishism, and transvestism from its list of paraphilias, thus diverging significantly from the DSM-5, it seems even more important to use as precise a language as possible when speaking about these subjects.

High prevalence does not, however, imply that the affected individuals do not find life with their preference in current society problematic. Studies on individuals with paraphilic interests (such as pedophilia) show increased rates of personality disturbances, mood disorders, and intimacy deficits (Gerwinn et al., 2018; Raymond et al., 1999), which can be related to their sexual preference. It might also be a result of the stigmatization stress that these individuals face in contemporary societies (e.g., Jahnke, 2018).

It should be noted, though, that due to methodological differences, comparisons of the prevalence of paraphilic patterns reported by different studies can be problematic. Different authors use different questions (for instance, asking about "experience with a behavior" is different from asking about "desire for a behavior", with the latter likely to yield higher prevalence), different scales, and different criteria, so that some authors, for example, report any arousal higher than zero (Dawson et al., 2016), whereas others, such as ourselves and Joyal and Carpentier (2017), report only strong arousal. Meta-analytic comparison of existing studies based on unified criteria and transformed scales may be needed to gain a more accurate view of similarities and differences between surveys, let alone entire nations and cultures.

In line with our hypothesis and with previous research (e.g., Ahlers et al., 2011; Dawson et al., 2016; Joyal & Carpentier, 2017; Makanjuola, Adegunloye, & Adelekan, 2008; Oliveira Júnior & Abdo, 2010), we found that paraphilias are more common among men than among women in all dimensions of sexual experience. Compared to 13.6% of women, almost one-third of men admitted to the presence of at least one paraphilia in the dimension of Preference. In the dimension of Arousal, the differences were even greater: 40.2% of men compared to 18.7% of women. In the remaining dimensions of Porn Use, Fantasy, and Behavior, the prevalence was over 20% in men and 5% in women. Regarding the type of paraphilia, we found support for the prediction that sex differences would be present in all paraphilic patterns except for activities related to BDSM practices. This result is partly congruent with previous research (Joyal & Carpentier, 2017) in the sense that one could expect a comparable prevalence of complementary activities. This was mostly seen in the Behavior dimension (prevalence in men: beating and torture 1.6%, humiliation/submission 2.2%; prevalence in women: beating and torture 1.9%, humiliation/submission 2.1%).

Our study also shows that paraphilias and paraphilic interests involving unusual targets (e.g., pedophilia, zoophilia, hebephilia) are less common than paraphilic patterns involving unusual activities. In women, the prevalence of interest in paraphilic objects was close to zero. This is in line with evolutionary logic which highlights the importance of appropriate mate choice for reproductive success and inclusive fitness of both sexes. The choice of a partner with suitable reproduction-relevant characteristics, i.e., phenotypically normal, physically mature, consenting human partners as noted in the definition of paraphilia in DSM-5 (APA, 2013), is subject to intense selection and leaves less space for errors and mutations. This holds particularly for women, in whom the cost of reproduction and offspring nurture is higher than in men (Trivers, 1972). When it comes to extreme options, such as paraphilic objects or unusual partners, one can thus expect women to be more selective in their mate choice than men are.

Moreover, Dawson et al. (2016) suggested that sex differences in the prevalence of paraphilias could be linked to the level of sex drive which is on average higher among men than among women (Baumeister et al., 2001; Lippa, 2006). Higher sex drive motivates interest in paraphilic activities. Furthermore, this assumption is in line with studies which showed that high sex drive is linked to diverse sexual activities and could also lower the baseline of sexual aversion and disgust (Baumeister et al., 2001; de Jong, van Overveld, & Borg, 2013).

In regard to the possibility of socio-sexual explanations of sex differences e.g., women being more sexually restricted by society than men (Bhugra, Popelyuk, & McMullen, 2010), it must be noted that studies from across the world examining societies with various levels of restrictiveness (from very liberal to very conservative), all show higher prevalence of paraphilic interests and paraphilia in men. Interestingly, Långström and Seto (2006) found that the immigrant status of a respondent was not a significant correlate of paraphilic behavior and based on their findings, these authors claimed that "paraphilia-like behavior is not specific to sociocultural subgroups" (p. 433).

The abovementioned theoretical explanations could also account for sex differences and ought to be further explored in detail. Doing so, however, was beyond the scope of the present study. Nevertheless, it should be noted that with the exception of sex differences in the most prevalent paraphilic patterns (voyeurism, frotteurism/toucherism, and fetishism), which were of moderate effect size, differences between the prevalence of studied patterns were of negligible or low effect size.

The surprisingly low percentage of people with paraphilias who confided in health-care professionals found in our study

could be the cause of some concern for public safety and health policies because it indicates that most people with paraphilias tend to remain undetected until they violate the law. This finding may be specific to the Czech society (we have no comparison data from other countries) and it may be due to either a low need of external management of paraphilias on the part of affected individuals, due to the lack of an effective system of help and prevention on the part of the society, and at least in some cases, also due to a denial of one's own sexual problems. Of importance may also be the extreme stigmatization of paraphiles (e.g., Jahnke, Schmidt, Geradt, & Hoyer, 2015), which lowers the likelihood of contacting a health-care professional. In line with this explanation, individuals who admitted to pedophilia reported by far the lowest level of help seeking (the percentage in our sample was even lower than in Dombert et al., 2016, where 12.3% of pedophiles reported they think about seeking professional help). This is associated with the fact that pedophilic interest is heavily stigmatized (for an overview, see Jahnke, 2018). Further exploration of this subject is clearly needed.

The high internal consistency found across dimensions of sexual experience in most paraphilic patterns indicates that the results of various studies could perhaps be compared by proxy, that is, by using a different dimension highly correlated with the one in question. Based on our findings, the use of composite or factor scores is justified and could be recommended for future research. Nevertheless, in some paraphilias, we also found some interesting differences between their dimensions. For instance, zoophilia was the only paraphilia that displayed low levels of internal consistency across the tested dimensions for both men and women. It may thus seem that zoophilia-like behaviors may not be a manifestation of real zoophilic preference but rather of a different paraphilia (for instance, BDSM practices can involve sex with animals but the purpose is to humiliate a partner). In women, low levels of internal consistency were found also in other paraphilias, namely those involving human paraphilic subjects (hebephilia and pedophilia) and in activities involving crossdressing (autoandrophilia and transvestitism). Mostly, however, we found a notable discrepancy between behavioral aspects (Behavior, Porn Use) and other ratings of preference, which indicates that fantasies, preferences, and actual behavior do not necessarily match. This could be due to women being more fearful of the criminalization of sexually inappropriate behavior or also possibly due to fears of being victimized and a wish to remain in control of one's behavior.

In general, our results suggest that behavior might be constrained by external factors, such as lack of opportunity (e.g., paraphilic patterns related to BDSM require a willing partner) or law (e.g., pedophilia, biastophilia, zoophilia).

Limitations

The following limitations of our study should be considered. First of all, as discussed above, the prevalence rate is a direct result of the methodology used and may account for many differences among studies. Moreover, the number of paraphilic patterns described in the literature (Aggrawal, 2008) is large but the format of a national survey made it impossible to include them all. Another methodological concern has to do with the representativeness of our internet-based sample and generalization of results based on this sample to the population as a whole. The mode of contact is an important aspect of research that deals with subjects as intimate as sexual behavior and sexual preferences. On the one hand, an online setting provides an increased feeling of anonymity, so that individuals may well be more willing to reveal their preferences. Moreover, the online format enables access even to persons who live in remote areas or unique communities. On the other hand, this format also makes it more difficult to control the characteristics of people involved in a study. Generalizability of our results is furthermore limited by the fact that individuals without internet access are highly unlikely to get involved (Wright, 2006). Nevertheless, a previous study which compared two modes of contact (representative surveys conducted online and by phone) found no differences in the prevalence rates of paraphilic interests between the two modes of data collection (Joyal & Carpentier, 2017). We, therefore, believe that our internet-based data do provide a valid and important insight into the distribution of paraphilic preferences in the current Czech population.

Acknowledgments

The authors wish to thank Anna Pilátová and Timothy Wells for English proofreading.

Funding

This project was supported by the Czech Science Foundation project GACR (16-18891S), by the Charles University Research Centre, Charles University, Czech Republic [UNCE 204056], by the project "Sustainability for the National Institute of Mental Health" under grant Number LO1611, with financial support from the Ministry of Education, Youth and Sports of the Czech Republic under the NPU I program and by the Institutional Support for Longterm Development of Research Organizations – Charles University, Faculty of Humanities (Charles Univ, Fac Human 2019).

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References

Abdullahi, H., Jafojo, R. O., & Udofia, O. (2015). Paraphilia among undergraduates in a Nigerian university. *Sexual Addiction & Compulsivity*, *22*, 249–257. doi:10.1080/10720162.2015.1057662

Aggrawal, A. (2008). *Forensic and medico-legal aspects of sexual crimes and unusual sexual practices*. Boca Raton, FL: CRC Press.

Ahlers, C. J., Schaefer, G. A., Mundt, I. A., Roll, S., Englert, H., Willich, S. N., & Beier, K. M. (2011). How unusual are the contents of paraphilias? Paraphilia-associated sexual arousal patterns in a community-based sample of men. *Journal of Sexual Medicine*, *8*, 1362–1370. doi:10.1111/j.1743-6109.2009.01597.x

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychological Association.

Baumeister, R. F., Catanese, K. R., & Vohs, K. D. (2001). Is there a gender difference in sex drive? Theoretical views, conceptual distinctions, and

a review of relevant evidence. *Personality and Social Psychology Review*, *5*, 242–273. doi:10.1207/S15327957PSPR0503_5

Behrendt, N., Buhl, N., & Seidl, S. (2002). The lethal paraphiliac syndrome: Accidental autoerotic deaths in four women and a review of the literature. *International Journal of Legal Medicine*, *116*, 148–152. doi:10.1007/s00414-001-0271-x

Bhugra, D., Popelyuk, D., & McMullen, I. (2010). Paraphilias across cultures: Contexts and controversies. *Journal of Sex Research*, *47*, 242–256. doi:10.1080/00224491003699833

Breslow, N., Evans, L., & Langley, J. (1985). On the prevalence and roles of females in the sadomasochistic subculture: Report of an empirical study. *Archives of Sexual Behavior*, *14*, 303–317. doi:10.1007/BF01550846

Briken, P., & Krueger, R. B. (2018). From atypical sexual interests to paraphilic disorders: The planned ICD revisions related to paraphilic disorder. *Journal of Sexual Medicine*, *15*, 807–808. doi:10.1016/j.jsxm.2018.02.001

Cantor, J. M. (2012). Is homosexuality a paraphilia? The evidence for and against. *Archives of Sexual Behavior*, *41*, 237–247. doi:10.1007/s10508-012-9900-3

Český statistický úřad. (2013). *Databáze výsledků sčítání lidu, domů a bytů 2011: průřezové sčítání lidu, domů a bytů 2011 k 26. 3.2011*. Praha, Czech Republic: Author.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Critelli, J. W., & Bivona, J. M. (2008). Women's erotic rape fantasies: An evaluation of theory and research. *Journal of Sex Research*, *45*, 57–70. doi:10.1080/00224490701808191

Dawson, S. J., Bannerman, B. A., & Lalumière, M. L. (2016). Paraphilic interests: An examination of sex differences in a nonclinical sample. *Sexual Abuse*, *28*, 20–45. doi:10.1177/1079063214525645

de Jong, P. J., van Overveld, M., & Borg, C. (2013). Giving in to arousal or staying stuck in disgust? Disgust-based mechanisms in sex and sexual dysfunction. *Journal of Sex Research*, *50*, 247–262. doi:10.1080/00224499.2012.746280

Dombert, B., Schmidt, A. F., Banse, R., Briken, P., Hoyer, J., Neutze, J., & Osterheider, M. (2016). How common is men's self-reported sexual interest in prepubescent children? *Journal of Sex Research*, *53*, 214–223. doi:10.1080/00224499.2015.1020108

Dunsieth, N. W., Jr., Nelson, E. B., Brusman-Lovins, L. A., Holcomb, J. L., Beckman, D., Welge, J. A., … McElroy, S. L. (2004). Psychiatric and legal features of 113 men convicted of sexual offenses. *The Journal of Clinical Psychiatry*, *65*, 293–300. doi:10.4088/JCP.v65n0302

Federoff, J. P., Fishell, A., & Fedoroff, B. (1999). A case series of women evaluated for paraphilic sexual disorders. *The Canadian Journal of Human Sexuality*, *8*, 127.

Fromuth, M. E., & Conn, V. E. (1997). Hidden perpetrators: Sexual molestation in a nonclinical sample of college women. *Journal of Interpersonal Violence*, *12*, 456–465. doi:10.1177/088626097012003009

Gerwinn, H., Weiß, S., Tenbergen, G., Amelung, T., Födisch, C., Pohl, A., … Wittfoth, M. (2018). Clinical characteristics associated with paedophilia and child sex offending–Differentiating sexual preference from offence status. *European Psychiatry*, *51*, 74–85. doi:10.1016/j.eurpsy.2018.02.002

Hanson, R. K., & Morton-Bourgon, K. (2004). *Predictors of sexual recidivism: An updated meta-analysis*. Ottawa, ON: Public Works and Government Services Canada.

Holvoet, L., Huys, W., Coppens, V., Seeuws, J., Goethals, K., & Morrens, M. (2017). Fifty shades of Belgian gray: The prevalence of BDSM-related fantasies and activities in the general population. *The Journal of Sexual Medicine*, *14*, 1152–1159. doi:10.1016/j.jsxm.2017.07.003

Jahnke, S. (2018). The stigma of pedophilia. *European Psychologist*, *23*, 144–153. doi:10.1027/1016-9040/a000325

Jahnke, S., Schmidt, A. F., Geradt, M., & Hoyer, J. (2015). Stigma-related stress and its correlates among men with pedophilic sexual interests. *Archives of Sexual Behavior*, *44*, 2173–2187. doi:10.1007/s10508-015-0503-7

Janus, S. S., & Janus, C. L. (1993). *The Janus report on sexual behavior*. Hoboken, NJ: John Wiley & Sons.

Joyal, C. C. (2018). Controversies in the definition of paraphilia. *Journal of Sexual Medicine*, *15*, 1378–1380. doi:10.1016/j.jsxm.2018.08.005

Joyal, C. C., & Carpentier, J. (2017). The prevalence of paraphilic interests and behaviors in the general population: A provincial survey. *Journal of Sex Research*, *54*, 161–171. doi:10.1080/00224499.2016.1139034

Joyal, C. C., Cossette, A., & Lapierre, V. (2015). What exactly is an unusual sexual fantasy? *Journal of Sexual Medicine*, *12*, 328–340. doi:10.1111/jsm.12734

Kafka, M. (2012). Axis I psychiatric disorders, paraphilic sexual offending and implications for pharmacological treatment. *The Israel Journal of Psychiatry and Related Sciences*, *49*, 255–261.

Kinsey, A. C., Pomeroy, W. B., Martin, C. E., & Gebhard, P. H. (1998). *Sexual behavior in the human female*. Bloomington: Indiana University Press.

Krueger, R. B., Reed, G. M., First, M. B., Marais, A., Kismodi, E., & Briken, P. (2017). Proposals for paraphilic disorders in the International Classification of Diseases and Related Health Problems, eleventh revision (ICD-11). *Archives of Sexual Behavior*, *46*, 1529–1545. doi:10.1007/s10508-017-0944-2

Långström, N., & Seto, M. C. (2006). Exhibitionistic and voyeuristic behavior in a Swedish national population survey. *Archives of Sexual Behavior*, *35*, 427–435. doi:10.1007/s10508-006-9042-6

Långström, N., & Zucker, K. J. (2005). Transvestic fetishism in the general population. *Journal of Sex & Marital Therapy*, *31*, 87–95. doi:10.1080/00926230590477934

Laws, D. R., & O'Donohue, W. T. (Eds.). (2008). *Sexual deviance: Theory, assessment, and treatment*. New York, NY: Guilford Press.

Levitt, E. E., Moser, C., & Jamison, K. V. (1994). The prevalence and some attributes of females in the sadomasochistic subculture: A second report. *Archives of Sexual Behavior*, *23*, 465–473. doi:10.1007/BF01541410

Lippa, R. A. (2006). Is high sex drive associated with increased sexual attraction to both sexes? It depends on whether you are male or female. *Psychological Science*, *17*, 46–52. doi:10.1111/psci.2006.17.issue-1

Makanjuola, A. B., Adegunloye, O. A., & Adelekan, M. L. (2008). Disorders of sexual preference among secondary school teachers in Ilorin, Nigeria. *Nigerian Journal of Psychiatry*, *6*, 26–30. doi:10.4314/njpsyc.v6i1.39907

Marsh, P. J., Thomas, N., Davis, A. A., Buchanan, S. N., Meyer, C. S., & Grant, J. E. (2010). Paraphilias in adult psychiatric inpatients. *Annals of Clinical Psychiatry*, *22*, 129–134.

Marshall, W. L. (2007). Diagnostic issues, multiple paraphilias, and comorbid disorders in sexual offenders: Their incidence and treatment. *Aggression and Violent Behavior*, *12*, 16–35. doi:10.1016/j.avb.2006.03.001

Mohnke, S., Mueller, S., Amelung, T., Krüger, T. H., Ponseti, J., Schiffer, B., … Walter, H. (2014). Brain alterations in paedophilia: A critical review. *Progress in Neurobiology*, *122*, 1–23. doi:10.1016/j.pneurobio.2014.07.005

Oliveira Júnior, W. M. D., & Abdo, C. H. N. (2010). Unconventional sexual behaviors and their associations with physical, mental and sexual health parameters: A study in 18 large Brazilian cities. *Revista Brasileira De Psiquiatria*, *32*, 264–274. doi:10.1590/S1516-44462010005000013

Peter, J., & Valkenburg, P. M. (2006). Adolescents' exposure to sexually explicit material on the internet. *Communication Research*, *33*, 178–204. doi:10.1177/0093650205285369

Powls, J., & Davies, J. (2012). A descriptive review of research relating to sadomasochism: Considerations for clinical practice. *Deviant Behavior*, *33*, 223–234. doi:10.1080/01639625.2011.573391

Raymond, N. C., Coleman, E., Ohlerking, F., Christenson, G. A., & Miner, M. (1999). Psychiatric comorbidity in pedophilic sex offenders. *American Journal of Psychiatry*, *156*, 786–788. doi:10.1176/ajp.156.5.786

Reed, G. M., Drescher, J., Krueger, R. B., Atalla, E., Cochran, S. D., First, M. B., … Briken, P. (2016). Disorders related to sexuality and gender identity in the ICD-11: Revising the ICD-10 classification based on current scientific evidence, best clinical practices, and human rights considerations. *World Psychiatry*, *15*, 205–221. doi:10.1002/wps.20354

Santtila, P., Mokros, A., Hartwig, M., Varjonen, M., Jern, P., Witting, K., … Sandnabba, N. K. (2010). Childhood sexual interactions with other children are associated with lower preferred age of sexual partners including sexual interest in children in adulthood. *Psychiatry Research*, *175*, 154–159. doi:10.1016/j.psychres.2008.10.021

Seto, M. C. (2008). *Pedophilia and sexual offending against children*. Washington, DC: American Psychological Association.

Trivers, R. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection & the descent of man* (pp. 136–179). Chicago, IL: Aldine.

Van Der Walt, H. (2014). *Practitioner psychologists' understandings of bondage/discipline, dominance/ submission,sadomasochism (BDSM): Shared or separate from those who practise it* (Doctoral dissertation). Canterbury, UK: Canterbury Christ Church University.

World Health Organization. (1993). *The international classification of diseases. Classification of mental and behavioural disorders. Diagnostic criteria for research*. Geneva, Switzerland: Author.

Wright, K. B. (2006). Researching internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. *Journal of Computer-Mediated Communication*, *10*. doi:10.1111/j.1083-6101.2005.tb00259.x

Wurtele, S. K., Simons, D. A., & Moreno, T. (2014). Sexual interest in children among an online sample of men and women: Prevalence and correlates. *Sexual Abuse*, *26*, 546–568. doi:10.1177/1079063213503688

Zurbriggen, E. L., & Yost, M. R. (2004). Power, desire, and pleasure in sexual fantasies. *Journal of Sex Research*, *41*, 288–300. doi:10.1080/00224490409552236

Table S1. Correlations (Kendall Tau-B) between dimensions of Preference, Arousal, Porn Use, Fantasies, and Behavior with respect to autogynephilia and biastophilia among 5,023 men (above the diagonal) and 5,021 women (below the diagonal)

Dimension	Autogynephilia/autoandrophilia (5 items; α = .81 for total sample; α = .83 for men; α = .74 for women)					Beating/torture (5 items; α = .89 for total sample; α = .90 for men; α = .88 for women)				
	Preference	Arousal	Porn Use	Fantasies	Behavior	Preference	Arousal	Porn Use	Fantasies	Behavior
Preference	-	**.535**	**.382**	**.683**	**.471**	-	**.750**	**.613**	**.805**	**.658**
Arousal	**.432**	-	**.314**	**.513**	**.364**	**.767**	-	**.615**	**.737**	**.568**
Porn Use	.283	.215	-	**.488**	**.448**	**.493**	**.522**	-	**.673**	**.497**
Fantasies	**.663**	**.422**	**.382**	-	**.481**	**.792**	**.763**	**.571**	-	**.643**
Behavior	**.358**	.237	**.328**	**.425**	-	**.694**	**.667**	**.457**	**.690**	-

Note: Bolded correlations indicated significant correlations with medium effect size of .30 and more; α = *Cronbach's alpha*.

Table S2. Correlations (Kendall Tau-B) between dimensions of Preference, Arousal, Porn Use, Fantasies, and Behavior with respect to hebephilia and exhibitionism among 5,023 men (above the diagonal) and 5,021 women (below the diagonal).

Dimension	Biastophilia (5 items; α = .89 for total sample; α = .90 for men; α = .86 for women)					Exhibitionism (5 items; α = .84 for total sample; α = .85 for men; α = .80 for women)				
	Preference	Arousal	Porn Use	Fantasies	Behavior	Preference	Arousal	Porn Use	Fantasies	Behavior
Preference	-	**.636**	**.488**	**.676**	**.658***	-	**.613**	**.474**	**.646**	**.525**
Arousal	**.543**	-	**.474**	**.609**	**.622***	**.565**	-	**.448**	**.625**	**.462**
Porn Use	**.331**	**.336**	-	**.564**	**.466***	**.340**	**.356**	-	**.565**	**.474**
Fantasies	**.674**	**.570**	**.422**	-	**.586***	**.598**	**.569**	**.457**	-	**.539**
Behavior	**.552***	**.518***	**.384***	**.620***	-	**.460**	**.421**	**.357**	**.540**	-

Note: Bold font indicates significant correlations with medium effect size of .30 and more; * = Indicated wish for engaging in such activity if it were legal; α = *Cronbach's alpha.*

Table S3. Correlations (Kendall Tau-B) between dimensions of Preference, Arousal, Porn Use, Fantasies, and Behavior with respect to fetishism and frotteurism/toucherism among 5,023 men (above the diagonal) and 5,021 women (below the diagonal).

Dimension	Fetishism (5 items; α = .88 for total sample; α = .88 for men; α = .84 for women)					Frotteurism/Toucherism (5 items; α = .83 for total sample; α = .82 for men; α = .82 for women)				
	Preference	Arousal	Porn Use	Fantasies	Behavior	Preference	Arousal	Porn Use	Fantasies	Behavior
Preference	-	**.695**	**.622**	**.766**	**.647**	-	**.683**	**.445**	**.637**	**.615**
Arousal	**.546**	-	**.594**	**.710**	**.568**	**.661**	**-**	**.414**	**.613**	**.563**
Porn Use	**.446**	**.386**	-	**.683**	**.544**	**.389**	**.380**	**-**	**.568**	**.418**
Fantasies	**.721**	**.582**	**.524**	-	**.650**	**.631**	**.613**	**.522**	-	**.583**
Behavior	**.673**	**.512**	**.423**	**.685**	-	**.621**	**.581**	**.428**	**.614**	-

Note: Bold font indicates significant correlations with medium effect size of .30 and more; α = *Cronbach's alpha*.

Table S4. Correlations (Kendall Tau-B) between dimensions of Preference, Arousal, Porn Use, Fantasies, and Behavior with respect to immobilization and masochism among 5,023 men (above the diagonal) and 5,021 women (below the diagonal).

Dimension	Hebephilia (5 items; α = .91 for total sample; α = .91 for men; α = .79 for women)					Humiliation/submission (5 items; α = .90 for total sample; α = .91 for men; α = .89 for women)				
	Preference	Arousal	Porn Use	Fantasies	Behavior	Preference	Arousal	Porn Use	Fantasies	Behavior
Preference	-	**.753**	**.464**	**.699**	**.709***	-	**.781**	**.649**	**.819**	**.645**
Arousal	**.597**	-	**.456**	**.658**	**.728***	**.774**	-	**.659**	**.772**	**.571**
Porn Use	.186	.197	-	**.547**	**.463***	**.525**	**.526**	-	**.705**	**.510**
Fantasies	**.626**	**.490**	**.306**	-	**.663***	**.824**	**.780**	**.565**	-	**.639**
Behavior	**.546***	**.513***	.266*	**.476***	-	**.713**	**.637**	**.433**	**.671**	-

Note: Bold font indicates significant correlations with medium effect size of .30 and more; * = Indicated wish for engaging in such activity if it were legal; α = *Cronbach's alpha.*

Table S5. Correlations (Kendall Tau-B) between the dimensions of Preference, Arousal, Porn Use, Fantasies, and Behavior with respect to pedophilia and sadism among 5,023 men (above the diagonal) and 5,021 women (below the diagonal).

Dimension	Immobilization (5 items; α = .92 for total sample; α = .93 for men; α = .90 for women)					Pedophilia (5 items; α = .88 for total sample; α = .90 for men; α = .60 for women)				
	Preference	Arousal	Porn Use	Fantasies	Behavior	Preference	Arousal	Porn Use	Fantasies	Behavior
Preference	-	**.729**	**.610**	**.731**	**.665***	-	**.632**	**.426**	**.671**	**.585***
Arousal	**.672**	-	**.594**	**. 659**	**.703***	**.419**	-	**.411**	**.630**	**.638***
Porn Use	**.465**	**.454**	-	**.670**	**.587***	.097	.085	-	**.510**	**.484***
Fantasies	**.725**	**.660**	**.560**	-	**.654***	**.525**	**.451**	.097	-	**.616***
Behavior	**.653***	**.661***	**.462***	**.649***	-	**.443***	.271*	.132*	.276*	-

Note: Bold font indicates significant correlations with medium effect size of .30 and more; * = Indicated a wish for engaging in such activity if it were legal; α = *Cronbach's alpha.*

Table S6. Correlations (Kendall Tau-B) between the dimensions of Preference, Arousal, Porn Use, Fantasies, and Behavior with respect to transvestitism and voyeurism among 5,023 men (above the diagonal) and 5,021 women (below the diagonal).

Dimension	Transvestitism (5 items; α = .79 for total sample; α = .83 for men; α = .64 for women)					Voyeurism (5 items; α = .84 for total sample; α = .83 for men; α = .83 for women)				
	Preference	Arousal	Porn Use	Fantasies	Behavior	Preference	Arousal	Porn Use	Fantasies	Behavior
Preference	-	**.428**	**.431**	**.622**	**.596**	-	**.717**	**.477**	**.596**	**.516**
Arousal	.228	-	**.320**	**.422**	**.454**	**.713**	-	**.482**	**.610**	**.504**
Porn Use	.174	.135	-	**.566**	**.384**	**.431**	**.416**	-	**.581**	**.405**
Fantasies	**.485**	.259	.286	-	**.532**	**.644**	**.614**	**.544**	-	**.476**
Behavior	**.438**	.231	.296	**.538**	-	**.543**	**.486**	**.387**	**.507**	-

Note: Bold font indicates significant correlations with medium effect size of .30 and more; α = *Cronbach's alpha.*

Table S7. Correlations (Kendall Tau-B) between the dimensions of Preference, Arousal, Porn Use, Fantasies, and Behavior with respect to zoophilia among 5,023 men (above the diagonal) and 5,021 women (below the diagonal).

Dimension	Zoophilia (5 items; α = .85 for total sample; α = .86 for men; α = .77 for women)				
	Preference	Arousal	Porn Use	Fantasies	Behavior
Preference	-	**.618**	**.496**	**.643**	**.478**
Arousal	**.537**	-	**.554**	**.565**	**.356**
Porn Use	**.321**	**.408**	-	**.572**	.286
Fantasies	**.568**	**.569**	**.456**	-	**.399**
Behavior	**.408**	**.351**	.160	.232	-

Note: Bold font indicates significant correlations with medium effect size of .30 and more. α = *Cronbach's alpha.*

Kapitola IV

Bártová, K., Štěrbová, Z., Varella, M. A. C., & Valentova, J. V. (2020). Femininity in men and masculinity in women is positively related to sociosexuality. *Personality and Individual Differences*, *152*, 109575.

Personality and Individual Differences 152 (2020) 109575

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Femininity in men and masculinity in women is positively related to sociosexuality

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ARTICLE INFO

Keywords:
Sociosexuality
Gender nonconformity
Sexual orientation
Cross-cultural research

ABSTRACT

Sociosexuality, i.e. individual's willingness to engage in uncommitted sex, is systematically higher in men than in women, and can be considered a male typical trait. However, intrasexual variation in sociosexuality is considerable, with individual femininity/masculinity being one of the factors influencing sociosexuality. The aim of our study was to test, in heterosexual and homosexual men and women from Brazil and the Czech Republic, whether childhood gender nonconformity (CGN) and continuous gender identity in adulthood (CGI) are associated with individual sociosexual orientation (SOI-R). A sample of 1336 heterosexual and homosexual men and women completed questionnaires on CGN, CGI, and SOI-R. In general, correlations show that higher masculinity in heterosexual women and higher femininity in both heterosexual and homosexual men are related to higher sociosexuality. Higher sociosexuality in masculine women can be explained by prenatal or actual androgen effects on sexual libido and can reflect a fast life history strategy. In feminine men, this result might reflect female preferences for feminine characteristics in men and an overall shift towards male femininity which can increase individual fitness. Also, gender nonconforming individuals can be more liberal adopting behaviors which are considered as non-traditional. This study challenges the widely association between masculinity and unrestricted sociosexuality.

1. Introduction

Sociosexual orientation is defined as an individual's willingness to engage in uncommitted sex with a variety of partners (Penke & Asendorpf, 2008). Although women are, on average, more sexually restricted than men (Schmitt, 2005), there is a large within-sex variability (e.g., Lippa, 2009; Schmitt, 2007).

Existing studies show that one of the factors which influence sociosexuality is an individual's femininity/masculinity. It has been suggested that a more masculine developmental processes, such as higher exposure to organizational effects of prenatal androgens in both men and women, would be related to more masculine behavior, such as rough-and-tumble play, aggressiveness, or male-typical cognition (for review see, Lippa, 2005). As unrestricted sociosexuality can be considered a male-typical trait, we might expect that the same processes would lead to higher sociosexuality. Various studies have indeed shown that higher masculinity is linked to higher sociosexuality and numbers of sexual partners in both women (e.g., Burri, Spector, & Rahman, 2015; Howard & Perilloux, 2017; Mikach & Bailey, 1999; Ostovich & Sabini, 2004) and men (Arnocky et al., 2018; Gallup, White, & Gallup, 2007; Shoup & Gallup, 2008). Other research, however, shows that both feminine women (Manning & Fink, 2008; Rahman, Korhonen, & Aslam, 2005) and feminine men report higher promiscuity than their more masculine counterparts (e.g., Ostovich & Sabini, 2004; Zietsch et al., 2008). The mixed results of existing research could be partly due to specific sociocultural settings of various samples, since sociosexuality differs significantly between populations (Schmitt, 2005). In general, the mixed results do not support the organizational hormonal hypothesis, and they show that the relationship between sociosexuality and femininity/masculinity is multidimensional.

Importantly, the two sets of results are not mutually exclusive, as higher attractiveness and sociosexuality can be linked to a mosaic of

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https://doi.org/10.1016/j.paid.2019.109575
Received 29 November 2018; Received in revised form 19 June 2019; Accepted 23 August 2019

masculine and feminine traits (De Lurdes Carrito et al., 2016; Varella, Valentova, Pereira, & Bussab, 2014). In line with this, femininity/masculinity is not aligned among different modalities (facial, vocal, behavioral) in one individual, in particular in men (Pereira et al., 2019), and thus, for example, one male individual with feminine face and masculine voice can report high sociosexuality. Moreover, self-rated femininity/masculinity does not correlate with other-rated or measured femininity/masculinity in women (Pereira et al., 2019). Thus, results of the relationship between femininity/masculinity and sociosexuality depend on the method of femininity/masculinity measurement (see also Lippa, 2005, for review on the controversy of femininity/masculinity research).

A possible measure of individual level of femininity/masculinity is the gender nonconformity in childhood and adulthood. Gender nonconformity measures gender expression and gender role (e.g., individual's behaviors, attitudes, and personality traits), rather than morphological features (Rieger, Linsenmeier, Gygax, & Bailey, 2008). Gender nonconformity is highly heritable (Dawood, Horvath, Revelle, Pillard, & Bailey, 2000; Dunne, Bailey, Kirk, & Martin, 2000; Knafo, Iervolino, & Plomin, 2005; Pillard & Bailey, 1998), and a body of research showed that gender nonconformity in childhood and adulthood is one of the strongest predictors of adult sexual orientation, showing that homosexual individuals are, on average, more gender nonconforming than heterosexual individuals (D'Augelli et al., 2005; Dawood et al., 2000; Drummond, Bradley, Peterson-Badali, & Zucker, 2008; Bailey & Zucker, 1995). Both characteristics, gender nonconformity and at least some sub-types of homosexual orientation, can have common causes, such as genetic, hormonal and/or social (Bailey et al., 2016; Lippa, 2005; Swift-Gallant, Coome, Aitken, Monks, & VanderLaan, 2019). Interestingly, although non-heterosexual men and women tend to report a higher sociosexuality (Schmitt, 2007) and higher gender nonconformity (Bailey & Zucker, 1995) than heterosexuals, most studies investigating relationship between these two variables employed heterosexual populations. However, homosexual participants represent a unique opportunity to test whether the relation between gender nonconformity and sociosexuality maintains across groups of individuals that systematically vary in both studied variables. For example, we might expect that more gender nonconforming (masculine) heterosexual women would score higher on sociosexuality. However, this relationship might disappear in homosexual women, who have both variables relatively elevated. In more general terms, employing minorities into the research allows us to explore whether the same factors influencing majorities influence minorities in the same way, and thus deepen the understanding of human sexuality and its development.

As an attempt to gain greater understanding of the broad spectrum of gender nonconformity and its impact on sociosexuality, our main aim was to test, in a sample of heterosexual and homosexual men and women from two different populations, Brazil and the Czech Republic, whether the Childhood Gender Nonconformity Scale (CGN) and the Continuous Gender Identity Scale (CGI) are associated with individual sociosexuality. Brazil and the Czech Republic were sampled by convenience, and also because the populations differ in demographic, historical, sociocultural, linguistic, ethnical and physical aspects (Index Mundi, 2017), and offer thus an interesting opportunity to test for possible differences in human psychology and behavior.

2. Materials and methods

2.1. Participants

Our initial sample consisted of 2236 individuals. We excluded bisexuals (n = 82), persons who did not complete questionnaires (n = 781), and individuals below 18 and above 45 years (n = 37). Bisexuals were excluded because of their low number and because previous studies showed some specificities of this orientation (e.g., Schmitt, 2007; Semenyna, Belu, Vasey, & Honey, 2018). The final sample (n = 1336) consisted of 318 heterosexual women (*M*age = 25.4 years, SD = 5.6), 42 homosexual women (*M*age = 24.1 years, SD = 5.1), 164 heterosexual men (*M*age = 25.1 years, SD = 5.1), and 111 homosexual men (*M*age = 23.3 years, SD = 3.9) from Brazil, and 366 heterosexual women (*M*age = 27.9 years, SD = 7.1), 68 homosexual women (*M*age = 25.8 years, SD = 6.8), 133 heterosexual men (*M*age = 27.4 years, SD = 5.4) and 134 homosexual men (*M*age = 28.2 years, SD = 6.4) from the Czech Republic. Importantly, this was a convenience sample and not a representative sample of the studied populations. Participants were recruited directly via social networks and from mailing-lists of previous respondents and indirectly via snowball method. We sought to recruit a sufficient number of non-heterosexual individuals in order to allow for powerful statistical testing.

2.2. Measures

All participants indicated their position on a 7-point Kinsey scale (from 0 *exclusively heterosexual* to 6 *exclusively homosexual*). They were recruited as part of a larger project aimed at mate preferences and choices. We also followed the data and previous study (Valentova, Varella, Bártová, Štěrbová, & Dixson, 2017b) *ommitted* and collapsed the categories of sexual orientation near the extremes of the Kinsey scale based on the lower adjacent frequencies. Thus, we had a higher number of homosexual individuals for more robust comparisons allowing us to analyze variation within the heterosexual and homosexual groups. Therefore, men and women on positions 0–2 of the Kinsey scale were considered heterosexual, 4–6 homosexual, and persons on position 3 bisexual.

To measure gender nonconformity, we used two most common questionnaires, the Childhood Gender Nonconformity Scale (CGN) and the Continuous Gender Identity Scale (CGI; Rieger et al., 2008). The CGN scale consists of 7 statements, such as '*I preferred playing with girls rather than boys*' for men, etc. The CGI scale includes 10 items, such as '*It would be fun to go to a costume party dressed as [the opposite sex]*'. Participants indicated their agreement with each statement using a 7-point scale (ranging from *strongly disagree* to *strongly agree*). A higher score indicates higher gender nonconformity, (i.e. femininity in men and masculinity in women). Cronbach's alphas for the CGN scale were satisfactory: 0.841 and 0.873 and for the CGI scale were 0.736 and 0.787 for men and women, respectively.

All participants completed the Revised Sociosexual Orientation Inventory (SOI-R; Penke & Asendorpf, 2008), which measures individual willingness to engage in uncommitted sex with a variety of partners. It contains nine statements divided in three facets: sociosexual Behavior, Attitudes, and Desires. A total sociosexual orientation score can be obtained by summing all nine items together. Higher scores indicate an unrestricted sociosexuality. SOI–R total is a valid measure of global sociosexuality. Each of the three facets can have an indirect effect on the other two and on global sociosexuality (for more details see Penke & Asendorpf, 2008). The Cronbach's alphas were satisfactory: 0.848, 0.850, 0.753, 0.812 for the SOI-R Total, Behavior, Attitudes, and Desires, respectively. For descriptive statistics of SOI-R, see Table 1.

2.3. Procedure

The study was administered using an online questionnaire platform. First, each participant read and confirmed the informed consent, and continued to a battery of questionnaires. This study is part of a larger project on partner preferences (Štěrbová, Bártová, Nováková, Varella, Havlíček, & Valentova, 2017; Valentova, Bártová, Štěrbová, & Varella, 2016; Valentova, Bártová, Štěrbová, & Varella, 2017; Valentova, Štěrbová, Bártová, & Varella, 2016; Valentova, et al., 2017). The whole procedure took around 40 min.

Table 1
Descriptive statistics of a revised Sociosexual Orientation Inventory (SOI-R).

		SOI-R total[a]		SOI-R Behavior[b]		SOI-R Attitude[c]		SOI-R Desire[d]	
		M	SD	*M*	SD	*M*	SD	*M*	SD
Heterosexual women	BR	32.47	13.94	8.01	5.27	15.14	7.1	9.32	5.23
	CZ	32.57	12.92	7.8	4.84	15.13	6.96	9.64	4.78
Homosexual women	BR	36.36	14.83	9.64	5.31	17.17	6.69	9.55	5.70
	CZ	33.66	13.73	9.38	5.54	14.76	6.61	9.51	5.49
Heterosexual men	CZ	43.95	13.23	9.83	6.19	19.6	6.23	14.53	5.54
	BR	46.47	14.33	11.01	6.08	19.46	6.25	16.01	6.55
Homosexual men	BR	49.73	14.21	15.04	7.14	19.22	5.69	15.48	6.16
	CZ	42.25	15.33	12.41	6.92	16.5	7.1	13.34	5.53

[a] Absolute range = 9–81 (higher score a stronger tendency to unrestricted sociosexuality).
[b] Absolute range = 3–27 (higher score a stronger tendency to unrestricted sexual behavior).
[c] Absolute range = 3–27 (higher score a stronger tendency to unrestricted sexual attitudes).
[d] Absolute range = 3–27 (higher score a stronger tendency to unrestricted sexual desires).

2.4. Analyses

Analyses were performed using SPSS 21.0 (IBM Corp.). Normal distribution was violated in nearly all variables. As a normalisation procedure, we used log transformation. In men, age weakly correlated with SOI-R Total ($r(542) = 0.084$, $p = .049$) and with SOI-R Behavior ($r(542) = 0.165$, $p < .001$). In women, age weakly correlated with SOI-R Behavior ($r(794) = 0.177$, $p < .001$). Thus, we used partial correlations controlling for age.

To test for the effect of population, sex, and sexual orientation on the studied variables, we performed two multivariate General Linear Models with Childhood Gender Nonconformity and Continuous Gender Identity, or SOI-R and its subscales entering as dependent variables, and population (Brazil, Czech Republic) and group (heterosexual men and women and homosexual men and women) as factors, with age as a covariate. Effect sizes are indicated in partial Eta-squared (η_p^2). As a post-hoc test, we used Bonferroni correction for multiple tests.

3. Results

3.1. Partial correlations between gender nonconformity and SOI-R, controlling for age

In heterosexual women, Childhood Gender Nonconformity significantly positively correlated with all sociosexuality dimensions, in particularly with SOI-R Total ($r(681) = 0.136$, $p < .001$), SOI-R Behavior ($r(681) = 0.092$, $p = .017$), SOI-R Attitude ($r(681) = 0.127$, $p = .001$) and SOI-R Desire; ($r(681) = 0.083$, $p = .031$). Similarly, the Continuous Gender Identity positively correlated with SOI-R Total ($r(681) = 0.267$, $p < .001$), SOI-R Behavior ($r(681) = 0.133$, $p < .001$), SOI-R Attitude ($r(681) = 0.213$, $p < .001$) and SOI-R Desire ($r(681) = 0.259$, $p < .001$). In heterosexual men, the Childhood Gender Nonconformity positively correlated with SOI-R Desire ($r(294) = 0.119$, $p = .042$). No significant correlations were found among homosexual men and women.

Because sex, sexual orientation, and population influenced most of the studied variables (see below), we divided the dataset between these groups and performed correlations for each group separately (see Table 2).

In Brazilian heterosexual women, the Childhood Gender Nonconformity Scale positively correlated with SOI-R Total, SOI-R Attitude, and SOI-R Desire. In Czech heterosexual women, the Childhood Gender Nonconformity Scale weakly positively correlated with SOI-R Total and SOI-R Behavior. Moreover, the Continuous Gender Identity Scale positively correlated with SOI-R Total, SOI-R Behavior, SOI-R Attitude, and SOI-R Desire in both Brazilian and Czech heterosexual women. In Brazilian homosexual women, the Continuous Gender Identity Scale weakly positively correlated with SOI-R Desire.

Table 2
Partial correlations (*r*) controlling for age between the Childhood Gender Nonconformity Scale and the Continuous Gender Identity Scale, and a revised Sociosexual Orientation Inventory total score and subscales for respondents from Brazil and the Czech Republic.

			SOI-R Total	SOI-R Behavior	SOI-R Attitude	SOI-R Desire
Heterosexual women	CGN	BR	0.172**	0.090	0.171**	0.113*
		CZ	0.095†	0.092†	0.081	0.043
	CGI	BR	0.383***	0.170**	0.336***	0.330***
		CZ	0.168**	0.121*	0.108*	0.190***
Homosexual women	CGN	BR	−0.027	−0.115	−0.122	0.197
		CZ	−0.020	−0.031	−0.022	−0.003
	CGI	BR	0.078	−0.045	−0.030	0.301†
		CZ	0.008	−0.084	0.002	0.022
Heterosexual men	CGN	BR	0.066	−0.024	−0.012	0.157*
		CZ	−0.017	−0.009	−0.131	0.116
	CGI	BR	0.046	−0.070	0.014	0.135
		CZ	0.035	−0.008	−0.004	0.078
Homosexual men	CGN	BR	0.182†	0.220*	0.063	0.084
		CZ	0.024	0.008	0.018	0.022
	CGI	BR	0.188*	0.103	0.170†	0.108
		CZ	−0.031	0.024	−0.097	−0.012

Note: CGN = Childhood Gender Nonconformity Scale; CGI = Continuous Gender Identity Scale; SOI-R = revised Sociosexual Orientation Inventory.
† $p < .08$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

No significant correlation was found in Czech homosexual women.

In Brazilian heterosexual men, the Childhood Gender Nonconformity Scale positively correlated with SOI-Desire. Similarly, Brazilian homosexual men with higher Childhood Gender Nonconformity showed a higher SOI-R Total and SOI-R Behavior. Moreover, in Brazilian homosexual men, the Continuous Gender Identity Scale positively correlated with SOI-R Total and weakly with SOI-R Attitude. In Czech men, this correlation was not significant.

3.2. Effects of population, sex, and sexual orientation on the CGN and CGI

Population did not have a significant effect on the CGN or CGI ($p > .05$). Sexual Orientation, however, did have a significant effect on both the CGN ($F = 104.20$, $p < .001$, $\eta_p^2 = 0.191$) and on the CGI ($F = 21.48$, $p < .001$, $\eta_p^2 = 0.046$). All groups differed significantly in the CGN (all *p*'s < .006). Heterosexual men reported higher gender conformity than other groups, followed by heterosexual women, homosexual men, and homosexual women. In the CGI, heterosexual men did not differ from heterosexual women ($p = 1.00$), and they both scored lower on CGI than either group of homosexual individuals

(p's < .002). Homosexual women scored the highest on CGI (all p's < .005).

3.3. Effects of population, sex, and sexual orientation on the SOI-R

Country had a significant effect on SOI-R Total ($F = 15.37$, $p < .001$, $\eta_p^2 = 0.011$), SOI-R Behavior ($F = 16.59$, $p < .001$, $\eta_p^2 = 0.012$), SOI-R Attitudes ($F = 7.96$, $p = .005$, $\eta_p^2 = 0.006$), and SOI-R Desire ($F = 4.53$, $p = .033$, $\eta_p^2 = 0.003$). In all cases, Brazilians reported higher SOI-R than the Czech participants.

Sex and sexual orientation had a significant effect on SOI-R Total ($F = 96.73$, $p < .001$, $\eta_p^2 = 0.179$), SOI-R Behavior ($F = 71.42$, $p < .001$, $\eta_p^2 = 0.139$), SOI-R Attitudes ($F = 32.44$, $p < .001$, $\eta_p^2 = 0.069$), and SOI-R Desire ($F = 102.74$, $p < .001$, $\eta_p^2 = 0.188$). In SOI-R Total, heterosexual and homosexual men did not differ from each other ($p = 1.00$), and both scored significantly higher than both groups of women (p's < .001), whereas heterosexual women did not differ from homosexual women ($p = .322$). SOI-R Desire subscale yielded equivalent results. In the SOI-R Behavior subscale, homosexual men scored the highest (all p's < .001), followed by heterosexual men and homosexual women, who did not differ from each other ($p = 1.00$), but both scored higher than heterosexual women (p's < .01). In SOI-R Attitudes, heterosexual men scored the highest (p's < .03), followed by homosexual men, who did not differ from homosexual women ($p = .108$) but scored higher than heterosexual women ($p < .001$). Heterosexual women, who did not differ from homosexual women ($p = 1.00$), scored lower than heterosexual and homosexual men (p's < .001).

4. Discussion

The aim of this study was to test, in heterosexual and homosexual men and women from two populations, Brazil and the Czech Republic, the relationship between gender nonconformity (masculinity in women and femininity in men) and sociosexuality. In general, we found that higher masculinity in heterosexual women and higher femininity in both heterosexual and homosexual men was related to higher sociosexuality. This supports the explanation that sex atypicality is conductive to quantitative sexual strategy.

Analogously to earlier research (Clark, 2004; Mikach & Bailey, 1999; Ostovich & Sabini, 2004), we found in both populations a higher sociosexuality in more masculine heterosexual women. Higher sociosexuality in masculine women can be explained by prenatal or actual androgen effects on the libido (Hampson, Rovet, & Altmann, 1998). On a distal level of explanation, higher sociosexuality in masculine women can reflect a fast life history strategy (Luoto, Krams, & Rantala, 2018). In particular, masculine women are supposed to allocate more energy into earlier reproduction and also immediate resources, which can be linked to quantity of sexual partners.

In men, we found the opposite pattern. In particular, Brazilian heterosexual and homosexual men who were more feminine during childhood reported higher SOI-R Desire, SOI-R total and SOI-R Behavior, respectively. Moreover, Brazilian homosexual men who were more feminine during adulthood reported higher SOI-R Total and SOI-R Attitude. In Czech men, this correlation was not significant. Although weak and specific to just one population (Brazilian, not Czech), this association is in line with some earlier studies which found higher sociosexuality in feminine men (Ostovich & Sabini, 2004) or in men with a mosaic of feminine and masculine characteristics (Varella et al., 2014). Feminine characteristics in men, which are associated with for instance kindness and understanding, are appealing to women (Buss & Barnes, 1986). This result is in line with a theory of adaptiveness of an overall shift towards male femininity (Zietsch et al., 2008). Nevertheless, this finding can be frequency-dependent and feminine-male tactic seems to work better in contexts characterized by an overall lower male femininity, such as Brazil, where it has been shown that men are more masculine than their Czech counterparts at least in some dimensions of femininity/masculinity (e.g. facial and body hair; Valentova, Varella, Bártová, Štěrbová, & Dixson, 2017a).

Alternatively, gender nonconformity activates rather negative reactions among parents or peers, and gender nonconforming individuals are a risk group reporting lower well-being (Rieger & Savin-Williams, 2012). Thus, relatively feminine men and masculine women feel themselves as a minority, and, as a consequence, might behave in a more liberal way, adopting non-normative and non-traditionalist strategies, such as higher sexual promiscuity.

It should be mentioned that our sample is not representative of the studied populations because the sampling sought to recruit a sufficient number of non-heterosexual individuals. Further, participants have been recruited mainly from the middle-class population in the biggest cities of both countries, and thus are not properly cross-culturally diverse. The sample did not include all social classes or age groups. More cross-cultural comparisons are thus needed. It also needs to be taken into account that the sample size of homosexual women was relatively small. Another limitation of the current study is that it has focused on predominantly and exclusively heterosexual and homosexual men and women, while bisexual men and women were not included because of their small number. A previous study aimed at sociosexuality had shown that bisexual men and women differ in characteristic such as personality, sex drive, and relative openness to casual sex (e.g. Schmitt, 2007; Semenyna et al., 2018) thus it would be interesting to repeat this study with all sexual orientations to get a more detailed picture of how it affects the other variables, such as gender nonconformity and sociosexuality. Also, results obtained on other groups than heterosexual women were relatively weak, and should thus be taken with caution.

To conclude, we found that gender nonconformity is weakly but positively associated with sociosexuality in both women and men. Future studies should explore more dimensions of femininity/masculinity (e.g. vocal, behavioral, cognitive), because these dimensions can develop through different ontogenetic pathways.

Acknowledgements

The authors wish to thank Anna Pilátová for English proofreading. KB and ZS are supported by the Charles University Research Centre, Charles University, Czech Republic (UNCE 204056). KB was supported by the Grant Agency of the Czech Republic, Czech Republic (GACR 16-18891S). This study was also supported by the project "Sustainability for the National Institute of Mental Health", under grant number LO1611, with a financial support from the Ministry of Education, Youth and Sports of the Czech Republic under the NPU I program.

References

Arnocky, S., Carré, J. M., Bird, B. M., Moreau, B. J., Vaillancourt, T., Ortiz, T., & Marley, N. (2018). The facial width-to-height ratio predicts sex drive, sociosexuality, and intended infidelity. *Archives of Sexual Behavior, 47*, 1375–1385.

Bailey, J. M., Vasey, P. L., Diamond, L. M., Breedlove, S. M., Vilain, E., & Epprecht, M. (2016). Sexual orientation, controversy, and science. *Psychological Science in the Public Interest, 17*, 45–101.

Bailey, J. M., & Zucker, K. J. (1995). Childhood sex-typed behavior and sexual orientation: A conceptual analysis and quantitative review. *Developmental Psychology, 31*, 43–55.

Burri, A., Spector, T., & Rahman, Q. (2015). Common genetic factors among sexual orientation, gender nonconformity, and number of sex partners in female twins: Implications for the evolution of homosexuality. *The Journal of Sexual Medicine, 12*, 1004–1011.

Buss, D. M., & Barnes, M. (1986). Preferences in human mate selection. *Journal of Personality and Social Psychology, 50*, 559–570.

Clark, A. P. (2004). Self-perceived attractiveness and masculinization predict women's sociosexuality. *Evolution and Human Behavior, 25*, 113–124.

D'Augelli, A. R., Grossman, A. H., & Starks, M. T. (2005). Parents' awareness of lesbian, gay, and bisexual youths' sexual orientation. *Journal of Marriage and Family, 67*, 474–482.

Dawood, K., Horvath, C., Revelle, W., Pillard, R. C., & Bailey, J. M. (2000). Familial aspects of male homosexuality. *Archives of Sexual Behavior, 29*, 155–163.

De Lurdes Carrito, M., dos Santos, I. M. B., Lefevre, C. E., Whitehead, R. D., da Silva, C. F.,

Perrett, D. I., Lefevre, C. E., Whitehead, R. D., da Silva, C. F., & Perrett, D. I. (2016). The role of sexually dimorphic skin colour and shape in attractiveness of male faces. *Evolution and Human Behavior, 37*, 125–133.
Drummond, K. D., Bradley, S. J., Peterson-Badali, M., & Zucker, K. J. (2008D). A follow-up study of girls with gender identity disorder. *Developmental Psychology, 44*, 34–45.
Dunne, M. P., Bailey, J. M., Kirk, K. M., & Martin, N. G. (2000). The subtlety of sex-atypicality. *Archives of Sexual Behavior, 29*, 549–565.
Gallup, A. C., White, D. D., & Gallup, G. G., Jr. (2007). Handgrip strength predicts sexual behavior, body morphology, and aggression in male college students. *Evolution and Human Behavior, 28*, 423–429.
Hampson, E., Rovet, J. F., & Altmann, D. (1998). Spatial reasoning in children with congenital adrenal hyperplasia due to 21-hydroxylase deficiency. *Developmental Neuropsychology, 14*, 299–320.
Howard, R. M., & Perilloux, C. (2017). Is mating psychology most closely tied to biological sex or preferred partner's sex? *Personality and Individual Differences, 115*, 83–89.
Mundi, Index (2017). Retrieved August 20, 2019 https://www.indexmundi.com/factbook/compare/brazil.czech-republic.
Knafo, A., Iervolino, A. C., & Plomin, R. (2005). Masculine girls and feminine boys: Genetic and environmental contributions to atypical gender development in early childhood. *Journal of Personality and Social Psychology, 88*, 400–412.
Lippa, R. A. (2005). *Gender, nature, and nurture*. Routledge.
Lippa, R. A. (2009). Sex differences in sex drive, sociosexuality, and height across 53 nations: Testing evolutionary and social structural theories. *Archives of Sexual Behavior, 38*, 631–651.
Luoto, S., Krams, I., & Rantala, M. J. (2018). A life history approach to the female sexual orientation spectrum: Evolution, development, causal mechanisms, and health. *Archives of Sexual Behavior*, 1–36.
Manning, J. T., & Fink, B. (2008). Digit ratio (2D: 4D), dominance, reproductive success, asymmetry, and sociosexuality in the BBC Internet study. *American Journal of Human Biology, 20*, 451–461.
Mikach, S. M., & Bailey, J. M. (1999). What distinguishes women with unusually high numbers of sex partners? *Evolution and human behavior. 20. Evolution and human behavior* (pp. 141–150).
Ostovich, J. M., & Sabini, J. (2004). How are sociosexuality, sex drive, and lifetime number of sexual partners related? *Personality and Social Psychology Bulletin, 30*, 1255–1266.
Penke, L., & Asendorpf, J. B. (2008). Beyond global sociosexual orientations: A more differentiated look at sociosexuality and its effects on courtship and romantic relationships. *Journal of Personality and Social Psychology, 95*, 1113–1135.
Pereira, K. J., da Silva, C. S. A., Havlíček, J., Kleisner, K., Varella, M. A. C., Pavlovič, O., & Valentova, J. V. (2019). Femininity-masculinity and attractiveness—Associations between self-ratings, third-party ratings and objective measures. *Personality and Individual Differences, 147*, 166–171.
Pillard, R. C., & Bailey, J. M. (1998). Human sexual orientation has a heritable component. *Human Biology, 70*, 347–365.
Rahman, Q., Korhonen, M., & Aslam, A. (2005). Sexually dimorphic 2D:4D ratio, height, weight, and their relation to number of sexual partners. *Personality and Individual Differences, 39*, 83–92.
Rieger, G., Linsenmeier, J. A., Gygax, L., & Bailey, J. M. (2008). Sexual orientation and childhood gender nonconformity: Evidence from home videos. *Developmental Psychology, 44*, 46–58.
Rieger, G., & Savin-Williams, R. C. (2012). Gender nonconformity, sexual orientation, and psychological well-being. *Archives of Sexual Behavior, 41*, 611–621.
Schmitt, D. P. (2005). Sociosexuality from Argentina to Zimbabwe: A 48-nation study of sex, culture, and strategies of human mating. *Behavioral and Brain Sciences, 28*, 247–275.
Schmitt, D. P. (2007). Sexual strategies across sexual orientations: How personality traits and culture relate to sociosexuality among gays, lesbians, bisexuals, and heterosexuals. *Journal of Psychology and Human Sexuality, 18*, 183–214.
Semenyna, S. W., Belu, C. F., Vasey, P. L., & Honey, P. L. (2018). Not straight and not straightforward: The relationships between sexual orientation, sociosexuality, and dark triad traits in women. *Evolutionary Psychological Science, 4*, 24–37.
Shoup, M. L., & Gallup, G. G. (2008). Men's faces convey information about their bodies and their behavior: What you see is what you get. *Evolutionary Psychology, 6*, 469–479.
Štěrbová, Z., Bártová, K., Nováková, L. M., Varella, M. A. C., Havlíček, J., & Valentova, J. V. (2017). Assortative mating in personality among heterosexual and male homosexual couples from Brazil and the Czech Republic. *Personality and Individual Differences, 112*, 90–96.
Swift-Gallant, A., Coome, L. A., Aitken, M., Monks, D. A., & VanderLaan, D. P. (2019). Evidence for distinct biodevelopmental influences on male sexual orientation. *Proceedings of the National Academy of Sciences, 116*, 12787–12792.
Valentova, J. V., Varella, M. A. C., Bártová, K., Štěrbová, Z., & Dixson, B. J. W. (2017a). Mate preferences and choices for facial and body hair in heterosexual women and homosexual men: Influence of sex, population, homogamy, and imprinting-like effect. *Evolution and Human Behavior, 38*, 241–248.
Valentova, J. V., Bártová, K., Štěrbová, Z., & Varella, M. A. C. (2017b). Influence of sexual orientation, population, homogamy, and imprinting-like effect on preferences and choices for female buttock size, breast size and shape, and WHR. *Personality and Individual Differences, 104*, 313–319.
Varella, M. A. C., Valentova, J. V., Pereira, K. J., & Bussab, V. S. R. (2014). Promiscuity is related to masculine and feminine body traits in both men and women: Evidence from Brazilian and Czech samples. *Behavioural Processes, 109*, 34–39.
Valentova, J. V., Bártová, K., Štěrbová, Z., & Varella, M. A. C. (2016a). Preferred and actual relative height are related to sex, sexual orientation, and dominance: Evidence from Brazil and the Czech Republic. *Personality and Individual Differences, 100*, 145–150.
Valentova, J. V., Štěrbová, Z., Bártová, K., & Varella, M. A. C. (2016). Personality of ideal and actual romantic partners among heterosexual and non-heterosexual men and women: A cross-cultural study. *Personality and Individual Differences, 101*, 160–166.
Zietsch, B. P., Morley, K. I., Shekar, S. N., Verweij, K. J., Keller, M. C., Macgregor, S., ... Martin, N. G. (2008). Genetic factors predisposing to homosexuality may increase mating success in heterosexuals. *Evolution and Human Behavior, 29*, 424–433.

Kapitola V

Novák, O., Bártová, K., Vagenknecht, V., & Kateřina Klapilová, K. (2020). Attention Bias to and Recognition of Sexual Images. *Frontiers in Psychology - Health Psychology.* (v recenzním řízení).

Attention Bias to and Recognition of Sexual Images

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Keywords: Attention, Visuospatial Attention, Sexual, Erotic, Dot probe, Recognition, Pictures, Images.

Abstract

Attention to sexual stimuli is necessary for the development of sexual response, yet while there is some evidence of attention bias in favor of sexual stimuli, the direction and magnitude of the effect remain so far unknown. A high-powered sample of 113 participants was tested using the dot-probe task and picture recognition task to measure visuospatial attention to erotic images. Participants showed no attention bias in the dot-probe task (rB = 0.201, p = 0.064) but were significantly better at recognizing erotic rather than neutral or training pictures (d = 1.445 and 1.461, respectively, both $p <$ 0.001). These results indicate that spatial attention bias to sexual pictures is small, negligible, eventually nonexistent, or else the dot-probe task is not a reliable tool to assess it. Results of the picture recognition task, on the other hand, show that sexual stimuli are prioritized in memory and this should be explored in detail in future research.

1. Introduction

It is widely assumed that sexual stimuli capture attention. This is reflected in, for instance, the frequent use of sexual content in advertising (Hennink-Kaminski & Reichert, 2011; Reichert & Carpenter, 2003; Reichert, Lambiase, Morgan, Carstarphen, & Zavoina, 1999). It has been demonstrated that attentional processes play a central role in sexual arousal (Barlow, 1986; de Jong, 2009) and it is believed that they are processed much like other evolutionarily meaningful stimuli (Spiering & Everaerd, 2007). Nearly all theoretical concepts which operate with attention and sexual stimuli assume some form of attention bias. Surprisingly, though, only a handful of studies had so far investigated the particular patterns of attention toward sexual stimuli and even less studies employed cognitive tasks to do so.

The dot-probe task (also known as serial probe task, attentional deployment task, or visual probe task) is – alongside the modified Stroop task, visual search task, and eye-tracking, neither of which are discussed here (for a review, see Jiang & Vartanian, 2018) – one of the most widely used tool used to assess attention bias. Introduced in a context of research of attention to threat-related words in a clinically anxious population (MacLeod, Mathews, & Tata, 1986), the dot-probe task was developed to measure early automatic allocation of spatial attention. It operates on a simple assumption that people respond faster to probes presented in an attended rather than unattended area of visual display (Navon & Margalit, 1983; Posner, Snyder, & Davidson, 1980). In a typical setup, a participant is presented with pairs of stimuli (in a mixed pair trial e.g. sexual and neutral pictures or words), which are then replaced by a probe that appears in the location of one of the stimuli. Participants are instructed to localize or identify the probe as quickly as possible. A faster response to a probe appearing in the location of the sexual stimulus would suggest that attention was directed toward the sexual stimulus

(vigilance), while a slower response would indicate that attention was directed away from it (avoidance). The difference in mean response times between trials where a probe replaced a neutral picture and those where a probe replaced a sexual picture amounts to attention bias index, extreme scores of which are thought to reflect attention biases (MacLeod et al., 1986).

The main advantage of the dot-probe task over other methods of assessing attention bias is that it reflects a distinction between attentional vigilance and avoidance and its ecological validity can be increased by the use of pictures instead of words (Jiang & Vartanian, 2018). Moreover, it can be used to examine the progress of attention by varying the duration of exposure of stimulus pairs. And while there is considerable variation in stimulus exposure time – it can vary from 100 ms (Cooper & Langton, 2006) to 2,000 ms (Pottage & Schaefer, 2012) – most studies present the stimuli for 500 ms (Kagerer et al., 2014; Mogg, Philippot, & Bradley, 2004; Prause, Janssen, & Hetrick, 2008).

The dot-probe task is used widely. It found its way into various research areas including eating disorders (Aspen, Darcy, & Lock, 2013), chronic pain (Dehghani, Sharpe, & Nicholas, 2003), smoking (Hogarth, Mogg, Bradley, Duka, & Dickinson, 2003), alcohol (Townshend & Duka, 2001), phobias (Wenzel & Holt, 1999), anxiety (B. P. Bradley, Mogg, Falla, & Hamilton, 1998), and others. In short, it is at present one of the most widely used methods for assessing attention bias in both clinical and non-clinical populations.

Although the importance of attention in sexual functioning is beyond doubt, since it determines whether a sexual response will occur (Barlow, 1986), there is so far no clear consensus on how exactly people attend to sexual stimuli. Recently, Strahler and colleagues (Strahler, Baranowski, Walter, Huebner, & Stark, 2019) published a

meta-analysis on attention bias towards and distractibility by sexual cues. Combining the results from 2,933 participants in 32 studies (including eight studies that used the dot-probe task) they found a medium-size effect of g_z = 0.49, 95% *CI* [0.37, 0.61] for attention to sexual cues in general and an effect size of g_z = 0.34, 95% *CI* [0.17, 0.50] for the dot-probe task (and letter probe) in particular. However, due to differences in the methodologies used, the attention bias as measured by this meta-analysis combined several, and sometimes opposite, effects. To provide a more detailed analysis, we offer in the following a full review of studies which assessed attention bias to sexual pictures using the dot-probe task.

The first one to measure attention bias to sexual stimuli using a picture dot-probe task were Prause and colleagues (2008), who focused on the relationship between attentional and emotional response to sexual stimuli and participants' sexual desire. Although the authors did not report exact values, their results suggest that in mixed pair trials, participants displayed slower reactions to probes which replaced sexual pictures than to those where probes replaced neutral pictures. More generally, participants exhibited slower reactions in all trials containing sexual pictures than in trials that used pairs neutral stimuli (η^2_p = 0.46). This effect was even more pronounced in participants with higher levels of sexual desire and in trials with more explicit sexual content (η^2_p = 0.12 and 0.31, respectively). A similar pattern of response times was found in a study which compared attention bias for sexual pictures in women with and without the hypoactive sexual desire disorder (Brauer et al., 2012). As in the previous study, participants were in mixed pair trials slower at detecting probes which replaced sexual images compared to probes replacing neutral pictures. At the same time, their responses were fastest in trials containing neutral pairs. These results held for both the experimental and control group (η^2_p = 0.34). Given the fact that sexual stimuli are

considered highly salient (Spiering & Everaerd, 2007) and as such should attract attention, thus allowing for faster reactions to replacement by a probe, these results are somewhat counterintuitive. Prause and colleagues explained their findings in terms of delayed disengagement and inhibition to return (Posner & Cohen, 1984), meaning that participants' attention was overwhelmed by the sexual content and could not disengage from it very fast. Such effect was observed in highly anxious individuals who found it difficult to disengage from fear-inducing but not sad or other emotional stimuli (Georgiou et al., 2005; Rinck, Becker, Kellermann, & Roth, 2003). Some authors call this rather consistent effect 'sexual content-induced delay' (Imhoff, Barker, & Schmidt, 2019).

Several later studies used a picture dot-probe task in slightly different contexts. Doornwaard and colleagues investigated how short erotic film clips affect the performance of the task (Doornwaard, van Den Eijnden, Johnson, & ter Bogt, 2014). Once again, participants responded faster to neutral pair trials than to mixed pair trials containing sexual pictures (η^2_p = .22). In mixed pair trials, however, they responded faster to probes replacing sexual pictures than to probes replacing neutral pictures (η^2_p = 0.07). Viewing of the erotic clips had no effect on their performance.

Kagerer and colleagues added a fourth type of trial, where both of the presented pictures were of a sexual nature (Kagerer et al., 2014). Similarly to the previous study, they found that participants reacted faster to probes replacing sexual pictures in mixed pair trials and to probes in neutral pair trials in general, and their reactions were in both cases faster than in mixed pair trials where the probe replaced the neutral picture (η^2 = 0.027 and 0.018, respectively). Nevertheless, their reactions in neutral pair trials in general did not differ from either sexual pair trials in general or mixed pair trials where the probe replaced a sexual picture.

Another study compared the attention bias index in individuals with and without compulsive sexual behavior (Mechelmans et al., 2014). Both the clinical and the control group had positive and non-zero attention bias towards explicit sexual stimuli, which in mixed pair trials manifested itself in faster responses to probes replacing sexual pictures than to those that replaced neutral pictures. Regrettably, the authors provided no values or effect sizes besides p-values. Employing the mTurk web platform, Seehuus (2015) compared different exposition times in the dot-probe task. In mixed pair trials, he found a significant attention bias toward probes following after sexual pictures for exposition times of 50 ms, 500 ms, and 1250 ms (η^2 = 0.129, 0.021 and 0.008, respectively). The study used no neutral pair trials. Following up with two experiments, Snowden and colleagues focused on gender-specific differences in the target stimuli (Snowden, Curl, Jobbins, Lavington, & Gray, 2016). In the first experiment, rather than pairing a sexual picture with a neutral one, they used pictures containing a nude male and a nude female. Their study employed shorter exposition times (200 ms). Their results showed that heterosexual men reacted faster when probe replaced a female picture (η^2 = 0.57), while in heterosexual women, no such difference was found. In a second experiment, they added neutral pictures. In line with the previous experiment, both men and women reacted faster to probes that followed female pictures in both male–female (η^2 = 0.172 and 0.075, respectively) and female–neutral trial (η^2 = 0.265 and 0.075, respectively), while in male–neutral trials, there was no difference in reaction times. So far, this is the only study that found any difference between men and women using the dot-probe paradigm.

While most of these reviewed studies showed that the presence of sexual pictures influences the attention to probes, the magnitude and direction of the attention bias turned out to be highly inconsistent (MacLeod et al., 1986). Some studies that used

mixed pair trials reported faster reactions to a probe replacing a sexual picture (Doornwaard et al., 2014; Kagerer et al., 2014; Mechelmans et al., 2014; Seehuus, 2015; Snowden et al., 2016), while others observed slower responses in such cases (Brauer et al., 2012; Prause et al., 2008).

Such mixed evidence may be the result of low reliability of the dot-probe paradigm as such (Schmukle, 2005; Staugaard, 2009). After all, an unreliable tool measures only error variance, thus leading to inconsistent results across studies (Schmukle, 2005). Snowden et al. (2016) suggest that the relatively low reliability of dot-probe task studies could be linked to a small size or perhaps even nonexistence of the effect they are trying to detect. Another source of this inconsistency could be publication bias. Publication bias is widespread in cognitive sciences in general (Ioannidis, Munafò, Fusar-Poli, Nosek, & David, 2008) and in research on attention to sexual stimuli research in particular (Strahler et al., 2019). Complete absence of nonsignificant results in published studies seems to support this explanation. In conjunction with high heterogeneity in the reviewed studies (Strahler et al., 2019), it shows a clear need of more high-powered simple studies employing the dot-probe task. The aim of the present study is to contribute to our knowledge of the magnitude and direction of the assumed attention bias towards sexual stimuli in nonclinical population as measured by the dot-probe task.

Further, in the light of concerns about dot-probe task's ability to assess early automatic allocation of spatial attention (see e.g. Cooper & Langton, 2006), it would be desirable to employ some validation measure (e.g. Miller & Fillmore, 2010). One way to validate the results could be by a picture recognition task. Previous studies arrived at the three following observations: 1) subjects tend to spend more time looking at highly valued pictures, 2) they recognize pictures they looked at longer irrespectively of

picture evaluation, and 3) subjects form no memory of pictures viewed only peripherally (Loftus, 1972). Based on the logic of the dot-probe task, MadLeod and colleagues (1986) suggested that sexual stimulus should capture participant's attention as soon as it appears and remain its focus it until a probe is revealed. Attention should thus be largely directed at sexual pictures. Since attention to a stimulus is crucial for a successful creation of memory of it (Bush & Geer, 2001; Pottage & Schaefer, 2012), we therefore predict that if the dot-probe task works as suggested, subjects should be able to recognize significantly more sexual than neutral pictures. In accordance with this reasoning, we employed in our study a simple picture recognition task. Previously, such recognition tasks were used with sexual stimuli only in the context of advertisement research (for a review, see Wirtz, Sparks, & Zimbres, 2017). To the best of our knowledge, we are thus the first to use a recognition task as an indicator of attention to sexual stimuli.

In the first study that used the dot-probe task for sexual pictures, Prause and colleagues (2008) found an unexpected negative relationship between attention bias towards sexual pictures and a broadly defined latent factor of sexual desire. In mixed trials, participants with higher levels of sexual desire were slower to detect probes replacing sexual pictures. Since the effect was rather robust and affected three major domains of sexual desire (desire for autoerotic sexual activity, desire for sexual activity with a partner, and overall propensity for sexual excitation), we concluded it should be manifest in other domains as well. To explore this further, we employed a revised Sociosexual Orientation Inventory (SOI–R; Penke & Asendorpf, 2008), because it features a sociosexual desire component which is described as sexual desire targeted at potential mates. Additionally, we used Beck Depressive Inventory (BDI-II; Ptáček, Raboch, Vňuková, Hlinka, & Anders, 2016) to control for depressive symptoms which

could negatively affect the levels of sexual desire in general (Frohlich & Meston, 2002) and therefore also any attention directed at sexual stimuli.

2. Materials and Methods

2.1. Participants

An a priori power analysis was conducted using G*Power 3.1.9.2 (Faul, Erdfelder, Lang, & Buchner, 2007) to test the difference between two dependent group means using a two-tailed test, a medium effect size $d = 0.34$ (the effect size estimate for the dot-probe task with sexual stimuli given by Strahler et al., 2019), and an alpha of 0.05. Results showed that a sample of 93 participants was required to achieve a power of 0.90.

A total of 119 Czech students were recruited at the Charles University campus. Data from six participants (four women, two men) were excluded from analyses due to high error rate (20% or more during the dot-probe task), leaving 113 participants (M_{age} = 22.00, SD_{age} = 4.47, 60.2 % females). This number was substantially higher than the desired sample size. All participants received a remuneration of 100 CZK (app. 4 EUR) for participation. Levels of depressive symptoms in our sample (M = 11.848, SD = 9.254) were comparable to those of a general healthy Czech population under thirty (M = 10.73, SD = 11.53; Ptáček et al., 2016).

2.2. Measures

The dot-probe task design was initially partially adapted from Prause, Janssen, and Hetrick (2008) but during pilot testing, most participants found it too easy. To increase the difficulty, we employed a modified version of the dot-probe task in which participants were asked to respond to probes' direction rather than merely their position.

2.2.1. The modified dot-probe task

In the dot-probe task, each trial started with an intertrial black screen displayed for 500, 750, 1000, or 1500 milliseconds followed by a fixation cross (1000 ms). Next, laterally randomized sexual and neutral pictures were simultaneously presented on the screen for 500 ms. Then the pictures disappeared and one was replaced by a probe in the form of an arrowhead pointing left or right, which stayed on the screen until a participant responded (see Figure 1). Participants were instructed to press quickly the key assigned for the probe's direction (Q for arrow pointing left, P for arrow pointing right). The lateral position of the probe, which picture category it replaced, and which direction it indicated were all randomized. The dot-probe task started with 20 training trials and continued with two blocks of 50 experimental trials, whereby each block used identical but randomly paired pictures.

2.2.2. Picture recognition task

In the picture recognition task, participants were presented with a series of pictures, some of which appeared previously in the dot-probe task (50 sexual, 50 neutral, and 40 training pictures), and some which functioned as distractors (225 pictures). By pressing assigned keys, participants were instructed to indicate whether they saw a picture previously during the dot-probe task (P) or not (Q). Participants went through the picture recognition task at their own pace because each picture stayed on the screen until a response was produced.

All stimuli were presented and responses recorded using E-Prime software package 2.0 (Schneider, Eschman, & Zuccolotto, 2002).

2.2.3. Questionnaires

All participants completed a short battery of questionnaires consisting of the Screening Questionnaire for psychiatric disorders, BDI–II (Beck, Steer, & Brown, 1996), SOI-R (Penke & Asendorpf, 2008), and Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). Back-translated and standardized Czech version of BDI-II (Ptáček et al., 2016) and back-translated versions of SOI-R and ERQ questionnaires were used. ERQ values were collected for different study and will be reported elsewhere.

2.3. Materials

All pictures used in the study were taken from standardized datasets, namely IAPS (Lang, Bradley, & Cuthbert, 1997) and NAPS (Marchewka, Zurawski, Jednoróg, & Grabowska, 2014). A total of 365 pictures depicting male–female couples, males, and females were pre-rated by 289 online raters for the sexual/nonsexual content. On this basis, we selected 57 sexual (IAPS: 4604, 4608, 4647, 4649, 4651, 4652, 4656, 4658, 659, 4660, 4664, 4666, 4668, 4669, 4670, 4672, 4676, 4677, 4680, 4681, 4683, 4687, 4690, 4692, 4693, 4694, 4695, 4697, 4698, 4800, 4810, 4232, 4290, 4311, 4460, 4470, 4490, 4550; NAPS: Opposite-sex_couple_002_h, Opposite-sex_couple_005_h, Opposite-sex_couple_008_h, Opposite-sex_couple_009_h, Opposite-sex_couple_012_h, Opposite-sex_couple_014_h, Opposite-sex_couple_017_v, Opposite-sex_couple_018_h, Opposite-sex_couple_023_h, Opposite-sex_couple_024_h, Opposite-sex_couple_025_h, Opposite-sex_couple_033_v, Female_002_h, Female_003_v, Female_018_h, Female_020_v, Male_008_v, Male_014_v, Male_022_v) and 97 neutral (IAPS: 2389, 2390, 4598, 4600, 4601, 4603, 4605, 4610, 4612, 4616, 4617, 4619, 4626, 4628, 4641, 4700, 8032, 8033, 8461, 8470, 2394, 2010, 2020, 2101, 2190, 2221, 2230, 2393, 2484, 2485, 2488, 2489, 2493, 2630,

5410, 7550, 8080, 8130, 8160, 8320, 8350, 9160; NAPS: Opposite-sex_couple_006_h, Opposite-sex_couple_019_v, Opposite-sex_couple_021_h, Opposite-sex_couple_026_h, Opposite-sex_couple_028_h, Opposite-sex_couple_032_h, Opposite-sex_couple_035_h, Opposite-sex_couple_037_h, Opposite-sex_couple_038_h, Opposite-sex_couple_039_h, Opposite-sex_couple_041_v, Opposite-sex_couple_042_h, Opposite-sex_couple_044_h, Faces_356_h, Faces_162_h, Faces_242_h, Faces_278_h, Faces_301_h, Faces_307_v, Faces_318_v, Faces_327_v, Faces_335_h, Faces_346_v, Faces_342_h, Faces_281_h, Faces_288_h, Faces_305_h, Faces_354_v, People_162_h, Faces_246_v, Faces_249_v, Faces_314_h, Faces_316_h, Faces_325_v, Faces_337_h, Faces_348_h, Faces_144_h, Faces_154_h, Faces_158_h, Faces_167_v, Faces_185_v, Faces_187_v, Faces_189_v, Faces_191_v, Faces_192_h, Faces_196_h, Faces_204_v, Faces_211_h, Faces_226_h, Faces_238_h, Faces_251_v, Faces_258_h, Faces_312_h, Faces_326_h, Faces_332_v) pictures. 43 sexual pictures depicted naked heterosexual pairs engaging in sexual activities, while 14 sexual pictures depicted nudity (7 showed a naked man and 7 a naked woman). These latter pictures were used in the female and male version of the task, respectively. For each of the 50 sexual pictures, there was a neutral picture matched for content, i.e. the neutral pictures depicted mainly clothed heterosexual pairs, single women or single men. Another 40 more neutral pictures depicting clothed men (one man per picture) were used for the training phase of the dot-probe task. The rest of the 365 original pictures was used as distractors for the picture recognition task.

2.4. Procedure

Students were addressed by an assistant at the university campus and offered participation in the study. Upon agreeing to participate, they received further

information to read, their eventual questions were answered, and all participants signed the informed consent form. At the outset, each participant completed the Screening Questionnaire, BDI–II, SOI–R, and ERQ. Next, each participant was seated in front of a personal computer and the dot-probe task and PRT were administered. Finally, each participant was debriefed and paid before leaving. The whole procedure took app. 30 minutes.

2.5 Data analysis

Data analyses were performed using R (R. C. Team, 2019) and JASP (J. Team, 2019). Dot-probe task reaction times (RT) were trimmed by incorrect responses (0.67% of all data) and values 4 *SD* above and below group mean (2.65 % of all data). Descriptive statistics are presented in Table 1. Due to technical issues, data were lost from 8 participants for BDI–II and 11 participants for SOI–R.

Attention bias index was computed for each participant by subtracting the mean reaction time in mixed pair trials where probe replaced a sexual picture from the mean reaction time in mixed pair trials where probe replaced a neutral picture. Positive values indicate vigilance to sexual pictures, whereas negative values indicate avoidance/difficulty to disengage from sexual pictures.

Because of normality violations ($p < 0.001$), a two-tailed Wilcoxon signed-rank test was used to calculate differences in reaction times between trials where probe replaced a neutral picture and trials where the probe replaced a sexual picture. Further, two-tailed Mann–Whitney U test was used to calculate the differences in attention bias index between men and women.

The relationship between attention bias index and sum scores of the questionnaires was tested using Spearman's rank correlation coefficient.

Because of concerns regarding low reliability of the dot-probe paradigm (Schmukle, 2005; Staugaard, 2009) split-half reliability estimates were calculated by correlating the first half of the trials with the second half.

We calculated accuracy scores (% of correct recognitions) for the picture recognition test. Correct recognition meant marking sexual, neutral, and training pictures as previously seen and marking distractors as not seen before. Since distractor accuracy scores were high (M = 87.8 %, SD = 12.2 %), they were screened for outliers and not used in the final analysis. The rest of accuracy scores was included in a mixed ANOVA with one within-subject factor (sexual, neutral, training) and one between-subjects factor (men, women).

For all tests, the alpha level of statistical significance was set to 0.05 and effect sizes and confidence intervals calculated.

2.6. Ethics statement

Participants were informed about the whole procedure and signed written informed consent. They were made aware of the fact that the tasks would feature some explicit sexual material. All experimental procedures were in accordance with the Helsinki Declaration and the study was approved by the Ethics committee of the National Institute of Mental Health, Klecany (No 47/16).

3. Results

3.1 Modified dot–probe task

A Wilcoxon's signed-rank test showed that the difference between trials with probe replacing a sexual picture (*Mdn* = 611.06 ms) and trials with probe replacing a neutral picture (*Mdn* = 615.41 ms) was statistically not significant (W = 3868, p = 0.064,

Hodges–Lehmann estimate = 4.520 ms, 95% *CI* [–0.247; 9.836], matched rank biserial correlation r_B = 0.201, 95% *CI* [–0.009; 0.394]). Moreover, Mann–Whitney U test showed that the difference in attention bias index between men (*Mdn* = 2.495 ms) and women (*Mdn* = 2.340 ms) was not statistically significant either (W = 1448, p = 0.633, *Hodges–Lehmann estimate* = –1.083 ms, 95% *CI* [–6.113; 3.659], matched rank biserial correlation r_B = –0.054, 95% *CI* [–0.266; 0.163]). See Figure 2 for illustration and Table 1 for summary.

All reliability estimates were well above 0.80 (see Table 2) and statistically significant (all $p < 0.001$).

3.2. Attention bias and questionnaires

We found positive correlations between attention bias index and the SOI-R Attitude subscale ($r_s(100)$ = 0.274, 95% *CI* [0.084; 0.445]) and between attention index bias index and SOI-R Desire subscale (Desire subscale: $r_s(100)$ = 0.232, 95% *CI* [0.040; 0.407]), which were statistically significant (p = 0.005 and 0.019, respectively). There was no statistically significant correlation between attention bias index and either the SOI–R Behavior subscale ($r_s(100)$ = 0.147, 95% *CI* [–0.048; 0.331], p = 0.139) or the BDI–II sum score ($r_s(103)$ = 0.078, 95% *CI* [–0.116; 0.266], p = 0.430).

3.3. Picture recognition task

Mauchly's test indicated that the assumption of sphericity for the ANOVA had been violated ($\chi^2(2)$ = 0.551, $p < 0.001$), which is why degrees of freedom were corrected using Greenhouse–Geisser estimates of sphericity (ε = 0.696). There was a main effect of the within-subject factor (F(1.380, 153.222) = 213, $p < 0.001$, η^2 = 0.427). Post hoc tests using Bonferroni correction revealed that sexual pictures (*M* = 48.4 %, *SD* = 21.1)

were recognized more often than either the neutral (M = 19.3 %, SD = 14.3, d = 1.461, 95% CI [1.193; 1.724], $p < 0.001$) or the training pictures (M = 15.4 %, SD = 15.0, d = 1.445, 95% CI [1.180; 1.708], $p < 0.001$). Moreover, there was a significant difference between the two latter conditions (d = 0.353, 95% CI [0.162; 0.542], $p < 0.001$). Neither the main effect of the between-subjects factor (F(1, 111) = 0.521, η^2 = 0.005) or interaction between the two factors (F(1.380, 153.222) = 2.335, η^2 = 0.005) were statistically significant (p = 0.472 and 0.118, respectively). See Figure 3 for illustration and Table 3 for a summary.

4. Discussion

The aim of present study was to strengthen the evidence for attention bias towards sexual stimuli in a nonclinical population as measured by the dot-probe task. Contrary to all previous research which worked with the dot-probe task paradigm for sexual pictures, our main findings show no evidence of such bias in our data.

What we did find, however, was a large difference in recognition rates for all experimental categories of pictures presented in the picture recognition task. Participants were most successful in recognizing sexual pictures, achieving recognition rate of almost 50%. One might be tempted to explain this as random responding, but in the light of markedly lower recognition rates for neutral and training pictures, it is probably not the case. Neutral pictures were successfully recognized at just below a 20% rate and training pictures at 15% rate. Since neutral pictures were seen by participants at least twice, once in each block, while training pictures only once at the beginning of the dot-probe task, one might expect such result. The recognition task thus represents a strong, albeit indirect, confirmation of the assumption which the use of the dot-probe task is based on, namely that sexual pictures indeed attract spatial attention.

Our sample did not differ in depressive symptoms from normal population and depressive symptomatology did not affect the attention bias in any way. On the other hand, we found a weak but significant correlation between attention bias, SOI-R Attitude subscale, and the SOI-R Desire subscale. Higher ratings of openness to uncommitted sex and higher sociosexual desire were linked with a faster identification of probes replacing sexual pictures. These results are clearly divergent from Prause and colleagues' (2008) findings of a negative relationship between attention bias and sexual desire. Even so, confidence intervals indicate that the real effect may well be extremely small. We see this inconsistency with previous research as yet another sign of weak reliability of the dot-probe paradigm (see below). It is but natural that one should ask why the present study found no attention bias towards sexual pictures. There are several possible reasons:

1) *Our results may be related to specific variations in the methodology*. The 500 ms presentation time may have given participants enough time to freely shift attention before the probe appeared (Cooper & Langton, 2006; Jiang & Vartanian, 2018), the stimuli may have been too weak to capture attention, or they may have been too complex (Miller & Fillmore, 2010). It is also possible that the more demanding probe-identifying task diverted participants' attention, etc. The main problem with these explanations is that if small methodology changes weakened the effect as significantly as our results seem to suggest, the effect itself may not be as universal and robust as theorized.

2) *The study may have insufficient power to reliably find the effect*. If that is the case, given that with a sample size of 113 the study had a 95% probability of finding the reported effect had it been of size of at least 0.34, the real effect would have to be much

smaller, possibly on the lower bound of reported confidence interval (Strahler et al., 2019).

3) Our findings may represent one of the not so rare cases of false negative results.

4) *Attention bias may exist but the effect was obscured by another mechanism which interferes with the way dot-probe task works*. It has been suggested (Brauer et al., 2012; Prause et al., 2008) that delayed disengagement, as described in other emotionally arousing stimuli, may turn out to be such a mechanism. A large body of evidence showing a slowdown of reaction times in the presence of sexual stimuli (sexual content-induced delay; for a review, see Imhoff et al., 2019) certainly points in that direction. If that is the case, the dot-probe task is not an appropriate measure for attention bias.

5) *The dot-probe task may be a poor measurement instrument*. Although we found our results robust and reliable as indicated by the split-half reliability estimate, the dot-probe task measure as such has been criticized for extremely weak reliability (Schmukle, 2005; Staugaard, 2009). It has also been claimed that the dot-probe task cannot effectively distinguish between attention bias and the sexual content-induced delay and struggles to establish reliable findings in other research areas (see Kruijt, Parsons, & Fox, 2019; Strahler et al., 2019).

6) *The most obvious explanation is that there is no attention bias towards sexual pictures* – at least not in a form that can be measured by the dot-probe task – or that it is exceedingly small and easily drowned in a measurement error. Even the evidence from the recognition task is somewhat mixed. Sexual stimuli seem to be prioritized in memory, as shown in high free recall rates (Bradley, Karlsson, & Lang, 2017; Bush & Geer, 2001; Pottage & Schaefer, 2012), and a similar effect might as well apply to recognition of sexual pictures. In this context, the 50% recognition rate for sexual pictures could be maintained had participants attended to sexual stimuli only half the

time and not most of it as predicted. Nonetheless, to the best of our knowledge, this area has not been explored yet. Other sources of evidence in favor of existence of attention bias are not very convincing either. Eye-tracking studies which show early attentional orientation toward sexual pictures (Fromberger et al., 2012; Lykins, Meana, & Kambe, 2006) are seriously underpowered. The constantly increasing use of erotica in advertisement (Reichert & Carpenter, 2003; Reichert et al., 1999) may be explained by other properties of sexual stimuli, namely its arousing nature and its effect on memory mentioned just above. To date, there is no convincing evidence for visuospatial attention capture by sexual stimuli (Imhoff et al., 2019; Strahler et al., 2019).

5. Conclusion

The present study employed a modified dot-probe task to measure attention bias toward sexual pictures in a non-clinical population. Additionally, we used a simple picture recognition task as a measure of dot-probe task validity. Although the findings of the picture recognition task did suggest increased attention towards sexual pictures, dot-probe task results showed no effect whatsoever. Moreover, there were no differences between men and women. We discussed several implications and possible explanations of our non-significant finding. In conclusion, our findings and literature search suggest that either the attention bias toward sexual pictures is rather small, the bias in the theorized form does not exist, or the dot-probe task is not a reliable tool to assess it.

6. Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

7. Funding

The study was supported by the project GACR (GA17–11004S) and by the project NPU I (LO1611).

8. Acknowledgments

We would like to thank the Faculty of Humanities and the Faculty of Science of the Charles University for letting us use their premises for data collection and AP for English proofreading.

9. References

Aspen, V., Darcy, A. M., & Lock, J. (2013). A Review of Attention Biases in Women with Eating Disorders. *Cognition and Emotion*, *27*(5), 820–838. https://doi.org/10.1080/02699931.2012.749777

Barlow, D. H. (1986). Causes of Sexual Dysfunction. The Role of Anxiety and Cognitive Interference. *Journal of Consulting and Clinical Psychology*, *54*(2), 140–148. https://doi.org/10.1037/0022-006X.54.2.140

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck depression inventory-II*. San Antonio, TX: The Psychological Corporation.

Bradley, B. P., Mogg, K., Falla, S. J., & Hamilton, L. R. (1998). Attentional Bias for Threatening Facial Expressions in Anxiety: Manipulation of Stimulus Duration. *Cognition and Emotion*, *12*(6), 737–753. https://doi.org/10.1080/026999398379411

Bradley, M. M., Karlsson, M., & Lang, P. J. (2017). Assessing Hedonic Bias in Emotional Scene Memory: Implications for Clinical Research. *Zeitschrift Für Psychologie / Journal of Psychology*, *225*(3), 223–231. https://doi.org/10.1027/2151-2604/a000306

Brauer, M., Van Leeuwen, M., Janssen, E., Newhouse, S. K., Heiman, J. R., & Laan, E. (2012). Attentional and Affective Processing of Sexual Stimuli in Women with Hypoactive Sexual Desire Disorder. *Archives of Sexual Behavior*, *41*(4), 891–905. https://doi.org/10.1007/s10508-011-9820-7

Bush, S. I., & Geer, J. H. (2001). Implicit and Explicit Memory of Neutral, Negative Emotional, and Sexual Information. *Archives of Sexual Behavior*, *30*(6), 615–631. https://doi.org/10.1023/A:1011915001416

Cooper, R. M., & Langton, S. R. H. (2006). Attentional Bias to Angry Faces Using the Dot-Probe Task? It Depends When You Look for It. *Behaviour Research and Therapy*, *44*(9), 1321–1329. https://doi.org/10.1016/j.brat.2005.10.004

de Jong, D. C. (2009). The Role of Attention in Sexual Arousal: Implications for Treatment of Sexual Dysfunction. *Journal of Sex Research*, *46*(2–3), 237–248. https://doi.org/10.1080/00224490902747230

Dehghani, M., Sharpe, L., & Nicholas, M. K. (2003). Selective Attention to Pain-Related Information in Chronic Musculoskeletal Pain Patients. *Pain*, *105*(1–2), 37–46. https://doi.org/10.1016/S0304-3959(03)00224-0

Doornwaard, S. M., van Den Eijnden, R. J. J. M., Johnson, A., & ter Bogt, T. F. M. (2014). Exposure to Sexualized Media Content and Selective Attention for Sexual Cues: An Experimental Study. *Computers in Human Behavior*, *41*, 357–364. https://doi.org/10.1016/j.chb.2014.10.037

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A Flexible Statistical Power Analysis Program for the Social, Behavioral, and Biomedical Sciences. *Behavior Research Methods*, *39*(2), 175–191.

Frohlich, P., & Meston, C. (2002). Sexual functioning and self-reported depressive symptoms among college women. *Journal of Sex Research*, *39*(4), 321–325. https://doi.org/10.1080/00224490209552156

Fromberger, P., Jordan, K., von Herder, J., Steinkrauss, H., Nemetschek, R., Stolpmann, G., & Müller, J. L. (2012). Initial Orienting Towards Sexually Relevant Stimuli: Preliminary Evidence from Eye Movement Measures. *Archives of Sexual Behavior*, *41*(4), 919–928. https://doi.org/10.1007/s10508-011-9816-3

Georgiou, G. A., Bleakley, C., Hayward, J., Russo, R., Dutton, K., Eltiti, S., & Fox, E. (2005). Focusing on Fear-Attentional Disengagement from Emotional Faces. *Visual Cognition*, *12*(1), 145–158. https://doi.org/10.1080/13506280444000076.Focusing

Gross, J. J., & John, O. P. (2003). Individual Differences in Two Emotion Regulation Processes: Implications for Affect, Relationships, and Well-Being. *Journal of Personality and Social Psychology*, *85*(2), 348–362. https://doi.org/10.1037/0022-3514.85.2.348

Hennink-Kaminski, H. J., & Reichert, T. (2011). Using Sexual Appeals in Advertising to Sell Cosmetic Surgery: A Content Analysis from 1986 to 2007. *Sexuality and Culture*, *15*(1), 41–55. https://doi.org/10.1007/s12119-010-9081-y

Hogarth, L. C., Mogg, K., Bradley, B. P., Duka, T., & Dickinson, A. (2003). Attentional Orienting Towards Smoking-Related Stimuli. *Behavioural Pharmacology*, *14*(2), 153–160. https://doi.org/10.1097/00008877-200303000-00007

Imhoff, R., Barker, P., & Schmidt, A. F. (2019). To What Extent Do Erotic Images Elicit Visuospatial versus Cognitive Attentional Processes? Consistent Support for a (Non-Spatial) Sexual Content-Induced Delay. *Archives of Sexual Behavior*, 1–20. https://doi.org/10.1007/s10508-019-01512-0

Ioannidis, J. P. A., Munafò, M. R., Fusar-Poli, P., Nosek, B. A., & David, S. P. (2008). Publication and Other Reporting Biases in Cognitive Sciences: Detection, Prevalence and Prevention. *Trends in Cognitive Sciences*, *18*(5), 235–241. https://doi.org/10.1038/jid.2014.371

Jiang, M. Y. W., & Vartanian, L. R. (2018). A Review of Existing Measures of Attentional Biases in Body Image and Eating Disorders Research. *Australian Journal of Psychology*, *70*(1), 3–17. https://doi.org/10.1111/ajpy.12161

Kagerer, S., Wehrum, S., Klucken, T., Walter, B., Vaitl, D., & Stark, R. (2014). Sex Attracts: Investigating Individual Differences in Attentional Bias to Sexual Stimuli. *PLoS ONE*, *9*(9). https://doi.org/10.1371/journal.pone.0107795

Kruijt, A.-W., Parsons, S., & Fox, E. (2019). A Meta-Analysis of Bias at Baseline in RCTs of Attention Bias Modification: No Evidence for Dot-Probe Bias Towards Threat in Clinical Anxiety and PTSD. *Journal of Abnormal Psychology*, *128*(6), 563–573.

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1997). International Affective Picture System (IAPS): Technical Manual and Affective Ratings. NIMH Center for the Study of Emotion and Attention. Retrieved from http://www.unifesp.br/dpsicobio/adap/instructions.pdf

Loftus, G. R. (1972). Eye Fixations and Recognition Memory for Pictures. *Cognitive Psychology*, *3*(4), 525–551. https://doi.org/10.1016/0010-0285(72)90021-7

Lykins, A. D., Meana, M., & Kambe, G. (2006). Detection of Differential Viewing Patterns to Erotic and Non-Erotic Stimuli Using Eye-Tracking Methodology. *Archives of Sexual Behavior*, *35*(5), 569–575. https://doi.org/10.1007/s10508-006-9065-z

MacLeod, C., Mathews, A., & Tata, P. (1986). Attentional Bias in Emotional Disorders. *Journal of Abnormal Psychology*, *95*(1), 15–20. https://doi.org/10.1037/0021-843X.95.1.15

Marchewka, A., Zurawski, L., Jednoróg, K., & Grabowska, A. (2014). The Nencki Affective Picture System (NAPS): Introduction to a Novel, Standardized, Wide-Range, High-Quality, Realistic Picture Database. *Behavior Research Methods*, *46*(2), 596–610. https://doi.org/10.3758/s13428-013-0379-1

Mechelmans, D. J., Irvine, M., Banca, P., Porter, L., Mitchell, S., Mole, T. B., … Voon, V. (2014). Enhanced Attentional Bias Towards Sexually Explicit Cues in Individuals with and Without Compulsive Sexual Behaviours. *PLoS ONE*, *9*(8). https://doi.org/10.1371/journal.pone.0105476

Miller, M. A., & Fillmore, M. T. (2010). The Effect of Image Complexity on Attentional Bias Toward Alcohol-Related Images in Adult Drinkers. *Addiction*, *105*(5), 883–890. https://doi.org/10.1038/jid.2014.371

Mogg, K., Philippot, P., & Bradley, B. P. (2004). Selective Attention to Angry Faces in Clinical Social Phobia. *Journal of Abnormal Psychology*, *113*(1), 160–165. https://doi.org/10.1037/0021-843X.113.1.160

Navon, D., & Margalit, B. (1983). Allocation of Attention According to Informativeness in Visual Recognition. *The Quarterly Journal of Experimental Psychology*, *35*(3), 497–512. https://doi.org/10.1080/14640748308402484

Penke, L., & Asendorpf, J. B. (2008). Beyond Global Sociosexual Orientations: A More Differentiated Look at Sociosexuality and Its Effects on Courtship and Romantic Relationships. *Journal of Personality and Social Psychology*, *95*(5), 1113–1135. https://doi.org/10.1037/0022-3514.95.5.1113

Posner, M. I., & Cohen, Y. (1984). Components of Visual Orienting. In H. Bouma & D. Bouwhuis (Eds.), *Attention and Performance* (pp. 531–556). London: Erlbaum. https://doi.org/10.2307/414713

Posner, M. I., Snyder, C. R., & Davidson, B. J. (1980). Attention and the Detection of Signals. *Journal of Experimental Psychology: General*, *109*(2), 160–174. https://doi.org/10.1037/0096-3445.109.2.160

Pottage, C. L., & Schaefer, A. (2012). Visual Attention and Emotional Memory: Recall of Aversive Pictures is Partially Mediated by Concurrent Task Performance. *Emotion*, *12*(1), 33–38. https://doi.org/10.1037/a0024574

Prause, N., Janssen, E., & Hetrick, W. P. (2008). Attention and Emotional Responses to Sexual Stimuli and Their Relationship to Sexual Desire. *Archives of Sexual Behavior*, *37*(6), 934–949. https://doi.org/10.1007/s10508-007-9236-6

Ptáček, R., Raboch, J., Vňuková, M., Hlinka, J., & Anders, M. (2016). Beckova Škála Deprese BDI-II - Standardizace a Využití v Praxi. *Česká a Slovenská Psychiatrie*, *112*(6), 270–274.

Reichert, T., & Carpenter, C. (2003). An Update on Sex in Magazine Advertising: 1983 to 2003. *Journalism & Mass Communication Quarterly*, *81*(4), 823–837.

Reichert, T., Lambiase, J., Morgan, S., Carstarphen, M., & Zavoina, S. (1999). Cheesecake and Beefcake: No Matter How You Slice It, Sexual Explicitness in Advertising Continues to Increase. *Journalism & Mass Communication Quarterly*, *76*(1), 7–20.

Rinck, M., Becker, E. S., Kellermann, J., & Roth, W. T. (2003). Selective Attention in Anxiety: Distraction and Enhancement in Visual Search. *Depression and Anxiety*, *18*(1), 18–28. https://doi.org/10.1002/da.10105

Schmukle, S. C. (2005). Unreliability of the Dot Probe Task. *European Journal of Personality*, *19*(7), 595–605. https://doi.org/10.1002/per.554

Schneider, W., Eschman, A., & Zuccolotto, A. (2002). E–Prime (Version 2.0). Pittsburgh, PA: Psychology Software Tools Inc.

Seehuus, M. (2015). *Discrepant Attentional Biases Toward Sexual Stimuli*. University of Vermont. Retrieved from https://scholarworks.uvm.edu/graddis/416

Snowden, R. J., Curl, C., Jobbins, K., Lavington, C., & Gray, N. S. (2016). Automatic Direction of Spatial Attention to Male Versus Female Stimuli: A Comparison of Heterosexual Men and Women. *Archives of Sexual Behavior*, *45*(4), 843–853. https://doi.org/10.1007/s10508-015-0678-y

Spiering, M., & Everaerd, W. (2007). The Sexual Unconscious. In E. Janssen (Ed.), *The Psychophysiology of Sex* (pp. 166–184). Indiana University Press.

Staugaard, S. R. (2009). Reliability of Two Versions of the Dot-Probe Task Using Photographic Faces. *Psychology Science Quarterly*, *51*(3), 339–350.

Strahler, J., Baranowski, A. M., Walter, B., Huebner, N., & Stark, R. (2019). Attentional Bias Toward and Distractibility by Sexual Cues: A Meta-Analytic Integration. *Neuroscience and Biobehavioral Reviews*, *105*(June), 276–287. https://doi.org/10.1016/j.neubiorev.2019.07.015

Team, J. (2019). JASP (Version 0.11).

Team, R. C. (2019). R: A Language and Environment for Statistical Computing. Vienna, Austria: R Foundation for Statistical Computing. Retrieved from https://www.r–project.org/

Townshend, J. M., & Duka, T. (2001). Attentional Bias Associated with Alcohol Cues: Differences Between Heavy and Occasional Social Drinkers. *Psychopharmacology*, *157*(1), 67–74. https://doi.org/10.1007/s002130100764

Wenzel, A., & Holt, C. S. (1999). Dot Probe Performance in Two Specific Phobias. *British Journal of Clinical Psychology*, *38*(4), 407–410. https://doi.org/10.1348/014466599163006

Wirtz, J. G., Sparks, J. V, & Zimbres, T. M. (2017). The Effect of Exposure to Sexual Appeals in Advertisements on Memory, Attitude, and Purchase Intention: A Meta-Analytic Review. *International Journal of Advertising*, *37*(2), 168–198. https://doi.org/10.1080/02650487.2017.1334996

7. Tables

Table 1. Dot-probe task: Mean RT (ms), median, and SD.

	All (N = 113)			Men (n = 45)			Women (n = 68)		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
All trials	628.242	613.950	128.926	601.969	603.768	106.153	645.629	621.594	140.056
$Trial_{sex}$	624.914	611.059	131.810	597.889	608.260	104.692	642.799	612.551	145.016
$Trial_{neutral}$	631.654	615.408	127.603	606.063	597.306	109.213	648.590	636.190	136.582
AB	3.370	2.495	14.607	4.087	2.495	13.169	2.895	2.340	15.563

Note: $Trial_{sex}$ = Trials with probe replacing sexual picture, $Trial_{neutral}$ = Trials with probe replacing neutral picture, AB = Attention bias index

Table 2. Dot-probe task: Split-half reliability estimates.

	Split half *r*	*CI* 95%	ρ_{SP}	p
All trials	0.894	[0.849; 0.926]	0.944	< 0.001
$Trial_{sex}$	0.881	[0.831; 0.917]	0.937	< 0.001
$Trial_{neutral}$	0.881	[0.831, 0.917]	0.937	< 0.001

Note: $Trial_{sex}$ = Trials with probe replacing sexual picture, $Trial_{neutral}$ = Trials with probe replacing neutral picture, ρ_{SP} = split–half reliability coefficient predicted by Spearman–Brown formula

Table 3. Picture recognition task: Mean accuracy scores (%), Median, and SD.

	All (N = 113)			Men (n = 45)			Women (n = 68)		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Sexual	48.389	48.0	21.091	49.867	50.0	21.786	47.412	45.0	20.724
Neutral	19.345	16.0	14.326	16.356	14.0	13.405	21.324	18.0	16.667
Training	15.376	10.0	15.049	13.556	10.0	14.157	16.581	12.5	15.597

8. Figure Legends

Fig. 1 The modified dot-probe task trial.

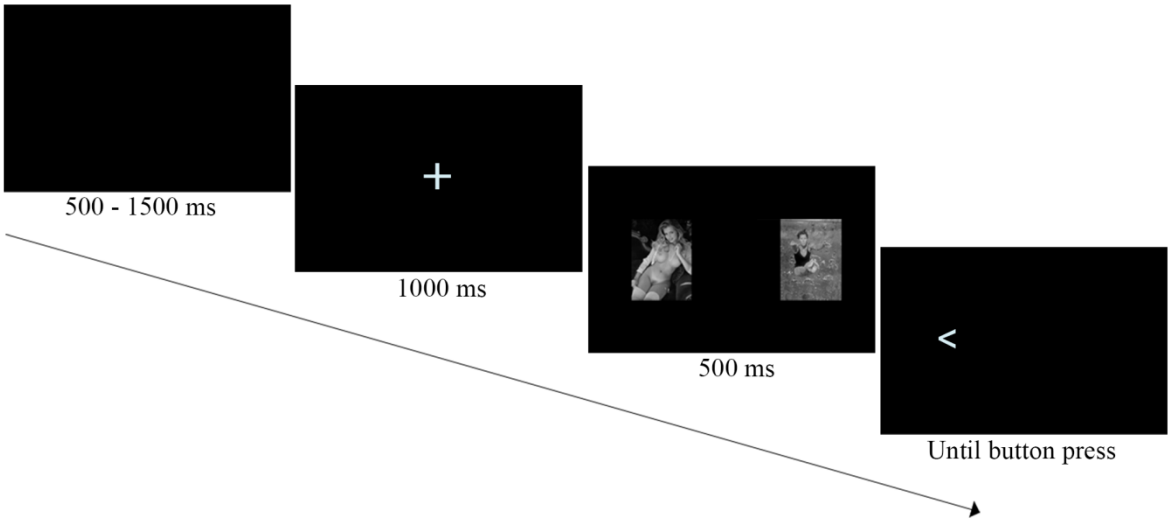


Fig. 2 Dot-probe task: Reaction times (ms).

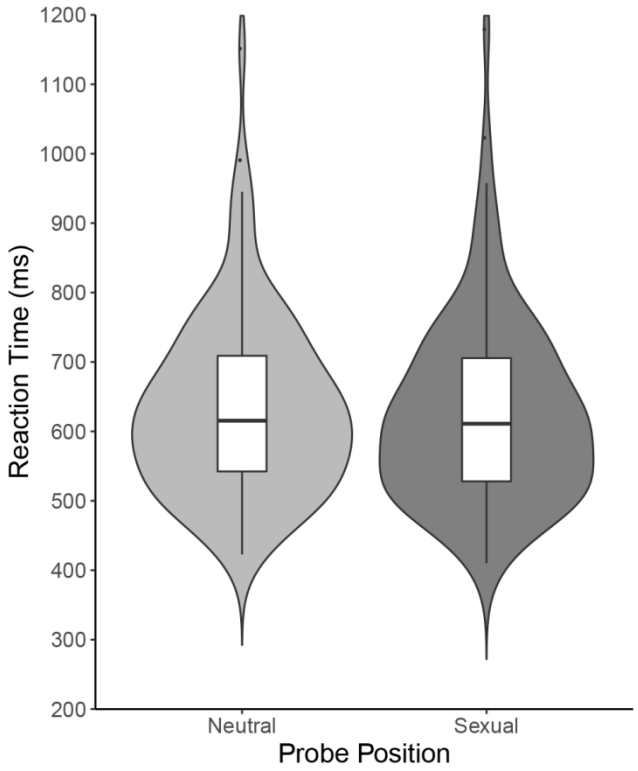
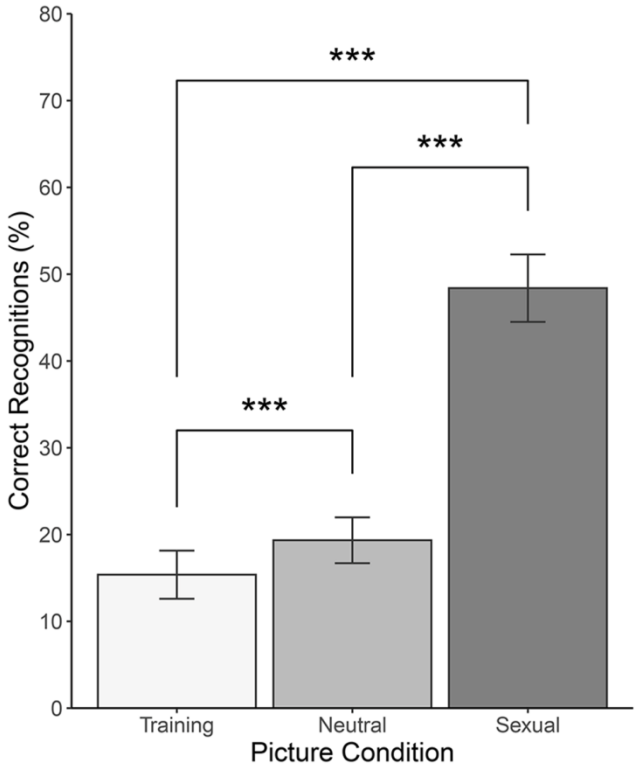


Fig. 3 Picture recognition task: Correct recognition (%) for training, neutral, and sexual pictures.



Note: *** $p < 0.001$

Kapitola VI

Bártová, K., Novák, O., Weiss, P. & Klapilová, K. (2020). The personality traits and sociosexual orientation are related to the sexual inhibition and sexual excitation scales: evidence from the Czech Republic. *Personality and Individual Differences* (v recenzním řízení).

The personality traits and sociosexual orientation are related to the sexual inhibition and sexual excitation scales: evidence from the Czech Republic

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Abstract

Numerous studies show that personality traits are linked to various aspects of sexuality and sexual health. A limited number of studies investigated associations between the Big Five personality traits and individual propensity to sexual excitation and inhibition, i.e. factors explaining individual variability in sexual responsiveness. We used Sexual Inhibition/Sexual Excitation Scales (SIS/SES) and NEO-Five Factor Inventory (NEO-FFI) to test these associations in a large Czech sample (N = 951), while focusing on sex and sexual orientation of participants. We confirmed that the SIS/SES is connected to several personality traits, with several specific associations related to sex and sexual orientation. SES positively correlates with Openness in heterosexual men and women and with Extraversion in heterosexual and non-heterosexual women but not in men. SIS scales negatively correlated with Extraversion and positively with Neuroticism across all groups except non-heterosexual men. In heterosexual women, SIS 1 was associated with Conscientiousness. A surprising finding is lack of associations between personality factors and SIS/SES in the group of non-heterosexual men.

Keywords: Sexual excitation; Sexual inhibition; Sociosexual orientation; Big Five

1. Introduction

Personality traits such as extraversion and neuroticism are often linked to various areas of sexuality and sexual health. A recent large meta-analysis found small but significant positive associations between the Big Five personality dimensions and sexual activity, risky sexual behaviour, sexual dysfunction, sexual satisfaction, emotional experiences in sex, attitudes toward sex, and sexual infidelity (Allen & Walter, 2018). One of the most consistent results was the association of high extraversion with greater sexual satisfaction and a higher number of sexual partners (Allen & Desille, 2017), while higher levels of neuroticism were associated with sexual dysfunctions (Gomes & Nobre, 2011) and lower levels of unrestricted sexual behaviour (Fernández del Río, Ramos-Villagrasa, Castro, & Barrada, 2019).

Such results, however, offer only a very general overview of the issue. More detailed and theoretically grounded measures are needed to unveil the subtle interplay of personality factors and sexual functioning. Such a tool might be found in the interindividual propensity to sexual excitation and inhibition suggested by Janssen and Bancroft (2007). Due to its clear link to neurobiological and cognitive mechanisms employed in controlling of sexual arousal and responsiveness, their dual control model offers a theoretical background for explanation of individual variability in sociosexual behaviour and sexual functioning. A factor analysis of the original sexual excitation and sexual inhibition scale (SIS/SES; Janssen, Vorst, Finn, & Bancroft, 2002a, 2002b) revealed one sexual excitation factor (a global measure of propensity for sexual arousal) and two sexual inhibition factors. The first (SIS1) is linked to the threat of performance failure or the overall higher inhibitory tone, while the second (SIS2) refers to fear of performance consequences. The SIS/SES, originally developed for use in male samples, was adapted for women by Carpenter, Janssen, Graham, Vorst, & Wicherts (2008). It

shows substantial variability in sexual inhibition and excitation scores in both sexes, with women scoring in general higher on sexual inhibition and lower on sexual excitation then men (Carpenter et al., 2008).

Various links between personality factors and the three dimensions of SIS/SES seem at hand but the subject has not been explored in detail as yet. One could, for instance, expect that personality dimensions positively related to appetitive goals, higher sensitivity to reward cues, or general correlation to behavioural activation, such as Extraversion and Openness to experience, would be highly relevant to sexual excitation and higher levels of hypersexual or unrestricted sociosexual behaviour and negatively linked to inhibition factors (Rettenberg et al., 2016). For Neuroticism, on the other hand, which is consistently linked to behavioural inhibition (e.g. Fruyt, van de Wiele, & van Heeringen, 2000), we could expect low connection to sexual excitation and a positive link to sexual inhibition. Personality dimensions correlated with avoidant or aversive goals and behavioural inhibitions, such as Agreeableness and Conscientiousness, should be positively related to the dimension of sexual inhibition and to higher sociosexual restrictiveness (e.g. Janssen et al., 2002a). Studies that actually investigated these associations are, however, few and far between. A recent Polish study (Kurpisz, Mak, Lew-Starowicz, Nowosielski, & Samochowiec, 2016) tested the link between propensity to excitation and inhibition and personality traits assessed by the well-established NEO Five-Factor Inventory (Costa & McCrae, 1985) on a representative sample of Polish males. They found that Extraversion was the best predictor of sexual responsiveness among personality traits: it was negatively correlated with both SIS1 (r = -.32) and SIS2 (r = -.34). Interestingly, though, it was not correlated with SES (r = .04). Neuroticism was positively linked only to SIS1 (r = .18), while Openness correlated with experience to SES (r = .18) and SIS1 (r = -.172).

Conscientiousness was linked to SIS2 (r = -.172), while Agreeableness was not associated with any of the SIS/SES factors. A German study (Rettenberger, Klein, & Briken, 2016) based on a larger sample consisting of both genders revealed comparable but weaker correlations. Similar results were found for Extraversion and SIS2 (r = -.06), Extraversion and SES (no correlation), Neuroticism and SIS1 (r = .21), Conscientiousness and SIS2 (r = .15) and Agreeableness (no correlations). Contrary to the Kurpisz et al. (2016), Extraversion was not correlated to SIS1, Neuroticism was positively linked to SIS2 (r = .16), Openness to experience had no significant correlations, and Conscientiousness positively correlated with SIS1 (r = .10). These inconsistencies may be due to different sample characteristics: Kurpisz and colleagues (2016) used a representative group of adult males, while Rettenberg et al. (2016) collected data from university students of both sexes and did not analyse the associations separately for men and women. To the best of our knowledge, no other studies used the Big Five personality dimensions to assess associations between personality traits and sexual excitation/inhibition.

There is a clear gap in existing literature: associations between personality dimensions and propensity to sexual excitation/inhibition have been investigated mainly in heterosexual samples, although evidence clearly suggests that such relationships might differ in relation to sexual orientation. For example, high SES and low SIS2 scores predicted sexual risk-taking in homosexual (Bancroft et al., 2003a) but not heterosexual men (Bancroft et al., 2003b). Homosexual men in general also scored higher on SES and SIS1 (Bancroft, Carnes, Janssen, & Long, 2005), while homosexual women scored lower in SIS1 and SIS2 (Sanders, Graham, & Milhaisen, 2008) than their heterosexual counterparts.

In the current study, we have therefore decided to explore the relationship between the Big Five personality dimensions with the SIS/SES scales with respect to sex and sexual orientation of participants. To this purpose, we used a large sample of Czech citizens.

2. Materials and methods

2.1. Participants

Participants were recruited via social networks, mailing lists of previous respondents, and the snowball method. The initial sample consisted of 1,269 individuals aged 18 to 75. We excluded respondents who failed to complete the questionnaire (n = 318). The final sample (n = 951) consisted of 300 heterosexual men (*M*age = 32.3 years, SD = 11.3), 47 non-heterosexual men (*M*age = 30.2 years, SD = 10.5), 523 heterosexual women (*M*age = 27.1 years, SD = 9.1), and 81 non-heterosexual women (*M*age = 25.5 years, SD = 6.3). All participants were residing in the Czech Republic.

2.2. Measures

Participants first indicated their position on the 7-point Kinsey scale (from 0 *exclusively heterosexual* to 6 *exclusively homosexual*). To perform group comparisons, we divided the sample into separate groups of heterosexual and non-heterosexual men and women. Thus, we have collapsed across categories of sexual orientation near the extremes of the Kinsey scale based on the on the lower adjacent frequency. By this method we obtained a higher number of non-heterosexual individuals for robust comparisons and testing for variation within the heterosexual and non-heterosexual groups. Respondents on positions 0–2 were considered heterosexual, those on positions 4–6 non-heterosexual (Bártová, Štěrbová, Varella, & Valentova, 2020).

To measure sexual inhibition and excitation, we used the Sexual Inhibition/Sexual Excitation Scale (SIS/SES; Carpenter et al., 2008; Janssen et al., 2002a, 2002b) consisting of 45 statements. The SES includes 20 items, SIS1 14 items, and SIS2 11 items. For our sample, we translated the questionnaire using translation and back translation into Czech. Cronbach's alphas for the SIS/SES scales were .883, .805, and .778 for SES, SIS1, and SIS2, respectively.

Participants were asked to assess their personality characteristics using the NEO-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1989; Czech version standardised by Hřebíčková & Urbánek, 2001). Each twelve items consisting of adjectives are summed to create five domains (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness). Cronbach's alphas for the NEO-FFI were .863, .729, .874, .888, .687 for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness, respectively.

To assess the construct validity of Czech version of SIS/SES, we used – following previous studies, such as (e.g. Carpenter et al., 2008; Janssen et al., 2002a; Velten, Scholten, & Margraf, 2018) – a revised Sociosexual Orientation Inventory (SOI-R; Penke & Asendorpf, 2008), which measures sociosexual orientation, that is, willingness to engage in uncommitted sex. SOI-R contains nine statements divided in three factors: Sociosexual Behaviour, Attitudes, and Desires. Higher scores indicate a stronger tendency to sociosexuality. Various studies (Carpenter, Janssen, Graham, Vorst, & Witcherts, 2008; Janssen et al., 2002a, 2002b) found that SOI is weakly positively correlated with SES (*r* ranging from .20 to .38), not correlated with SIS1, and moderately negatively correlated with SIS2 (*r* ranging from -.31 to -.47). Cronbach's alphas for SOI-R were .837, .806, .836, .815 for the SOI-R Total, Behaviour, Attitudes,

and Desires, respectively. For descriptive statistics of SIS/SES, SOI-R, and NEO-FFI, see Table 2 in Supplementary material.

2.3. Procedure

The study was administered online using Qualtrics, Inc. software (2009). Participants read and confirmed an informed consent form and continued to the battery of questionnaires. The entire procedure took app. 30 minutes.

2.4. Analyses

Analyses were performed using SPSS 21.0 (IBM Cop.). First, to test the effect of sex and sexual orientation on the SIS/SES, we performed multivariate General Linear Models (GLM) with SIS/SES scales as dependent variables and group as factors (heterosexual and non-heterosexual men and women), with age as a covariate. Effect sizes are indicated in partial Eta-squared (η_p^2). As a post hoc test, we used Bonferroni correction for multiple tests. Partial Pearson correlations showed whether the SIS/SES scales correlate with NEO-FFI and SOI-R; they were performed separately for each sex and sexual orientation group. All analyses were controlled for age, which turned out to correlate with majority of the tested variables: SIS2, SOI-R Total, Behaviour, Agreeableness, Conscientiousness, Neuroticism, and Openness (all p's < .027).

3. Results

3. 1. Effects of sex and sexual orientation on the SIS/SES

Sex/sexual orientation had a main effect on the SES ($F(3, 946) = 3.37$, $p = .018$, $\eta_p^2 = .011$), SIS1 ($F(3, 946) = 24.10$, $p < .001$, $\eta_p^2 = .071$), and SIS2 ($F(3, 946) = 34.83$, $p < .001$, $\eta_p^2 = .099$). Non-heterosexual men reported significantly higher SES than non-

heterosexual women did (p = .036), while other groups did not significantly differ from each other. In the SIS1, we found no difference between heterosexual and non-heterosexual women or between heterosexual and non-heterosexual men (both p = 1.000). Heterosexual men scored significantly lower than either of the two groups of women (all p's < .001). Non-heterosexual men scored significantly lower than heterosexual women (p = .020) but comparably to non-heterosexual women (p = .352). SIS2 yielded equivalent results.

3.2. Correlations between SIS/SES, NEO-FFI, and SOI-R

In heterosexual women, SES positively correlated with Extraversion and Openness. In non-heterosexual women, SES positively correlated with Extraversion, and in heterosexual men, SES positively correlated with Openness. In heterosexual men and both groups of women, SIS1 and SIS2 negatively correlated with Extraversion and positively with Neuroticism. In heterosexual women, SIS1 negatively correlated with Conscientiousness and SIS2 positively with Agreeableness. In non-heterosexual men, correlations between SES, SIS1, SIS2, and the Big Five dimensions were not significant (see Table 1).

In all groups except for non-heterosexual men, SES positively and SIS2 negatively correlated with SOI-R total score and all subscales. In non-heterosexual men, SES positively correlated only with SOI-R Desire. In heterosexual women, SIS1 correlated negatively with total SOI-R score (see Table 1).

4. Discussion

Our aim was to investigate links between sexual inhibition and excitation and the Big Five personality dimensions in a Czech sample of heterosexual and non-heterosexual

men and women. Our results showed differences in sexual excitation and inhibition between the sexes and sexual orientation groups.

Previous studies arrived at higher sexual excitation scores in men than in women (Carpenter et al., 2008) but in our sample, this was applied only to non-heterosexual men, who scored higher than non-heterosexual women. In other groups, we found no significant differences. In both inhibition factors, heterosexual men scored lower than either group of women. This corresponds to previous studies which show higher scores of sexual inhibition in women (e.g. Carpenter et al., 2008). Non-heterosexual men's inhibition scores were comparable to those of non-heterosexual women, which can be due to the previously reported greater concerns about performance failure in gay men (Bancroft et al., 2005).

Results on the association between SIS/SES and personality factors were highly comparable with previous studies. As expected, we found positive correlations between SES and Openness in heterosexual men and women, indicating that more curious and creative individuals of both sexes are more likely to become easily sexually aroused.

Both inhibition scales correlated negatively with Extraversion and positively with Neuroticism across all groups except for non-heterosexual men, indicating a high robustness of this association (Kurpisz et al., 2016; Rettenberg, et al., 2016). In heterosexual women, SIS1 negatively correlated with Conscientiousness and SIS2 positively with Agreeableness, which may imply that propensity to self-control and performance control as well as a higher sensitivity to the needs and feelings of others can be negatively linked to their sexual response. A link between Conscientiousness and sexual inhibition has been reported previously but with mixed results. Both positive and negative associations had been found with respect to SIS2 (instead of SIS1 found in our

study). This difference could be due to different sample characteristics and different questionnaires used (NEO-FFI in this study vs. TIPI in Rettenberg et al., 2016).

In contrast with previous studies, we have found a positive link between SES and Extraversion in both groups of women. This is in line with previous findings which show that extraverts have more sexual partners and more commonly engage in sexual intercourse (Allen & Desille, 2017). Although suggested, this link has not been found in previous studies, possibly because women were either lacking in the research sample (Kurpisz et al., 2016) or because they were not analysed as a separate group (Rettenberg et al., 2016).

A surprising finding is the lack of associations between personality factors and SIS/SES in the group of non-heterosexual men. This result can be explained by several factors. Firstly, our sample of non-heterosexual men was relatively small. It would be therefore advisable to repeat the study with a larger sample of non-heterosexual individuals. Previous studies had also repeatedly shown that while non-heterosexual men do differ from their heterosexual counterparts in characteristics such as personality and sociosexuality, there is also a large within-sex variability that is due not only to biological factors (e.g., sex and sexual orientation) but also, and perhaps especially, due to social and cultural influences (e.g., Lippa, 2009; Schmitt, 2005; 2007). The lack of associations between NEO-FFI and SIS/SES could thus be partly due to specific social and cultural characteristics of our sample that were not controlled for.

Correlations between the SIS/SES and SOI-R in the expected directions confirmed the construct validity of the Czech version of SIS/SES at least for the group of heterosexual men and both groups of women. In all groups except for non-heterosexual men, we found moderate positive correlations between the SES and SOI-R and moderate negative correlations between SIS2 and SOI-R. In other words, high

sexual excitation was associated with a higher tendency to engage in uncommitted sex and low levels of sexual inhibition could be linked to a higher likelihood of risky sexual behaviour. Similar results were found previously for samples not split by sex and sexual orientation (e.g. Carpenter et al., 2008; Janssen et al., 2002a, 2002b).

In sum, we confirmed that sexual excitation and inhibition is associated with several personality factors and the nature of this association differs depending on sex and sexual orientation. Nonetheless, our sample was non-representative and sizes of non-heterosexual groups relatively small. Due to these limitations, our findings are difficult to generalise. We therefore suggest that this study be repeated using a larger sample of non-heterosexual individuals and a representative sample to validate the SIS/SES questionnaire in Czech population.

5. References

Bártová, K., Štěrbová, Z., Varella, M. A. C., & Valentova, J. V. (2020). Femininity in men and masculinity in women is positively related to sociosexuality. *Personality and Individual Differences*, 152, 109575.

Allen, M. S., & Desille, A. E. (2017). Personality and sexuality in older adults. *Psychology & health*, *32*, 843-859.

Allen, M. S., & Walter, E. E. (2018). Linking big five personality traits to sexuality and sexual health: A meta-analytic review. *Psychological bulletin, 144*, 1081.

Bancroft, J., Graham, C. A., Janssen, E., & Sanders, S. A. (2009). The dual control model: Current status and future directions. *Journal of sex research, 46*, 121-142.

Bancroft, J., Carnes, L., Janssen, E., Goodrich, D., & Long, J. S. (2005). Erectile and ejaculatory problems in gay and heterosexual men. *Archives of Sexual Behavior*, *34*, 285-297.

Bancroft, J., Janssen, E., Strong, D., Carnes, L., Vukadinovic, Z., & Long, J. S. (2003a). Sexual risk-taking in gay men: The relevance of sexual arousability, mood, and sensation seeking. *Archives of sexual behavior*, *32*, 555-572.

Bancroft, J., Janssen, E., Strong, D., Carnes, L., Vukadinovic, Z., & Long, J. S. (2003b). The relation between mood and sexuality in heterosexual men. *Archives of sexual behavior*, *32*), 217-230.

Carpenter, D., Janssen, E., Graham, C., Vorst, H., & Wicherts, J. (2008). Women's scores on the Sexual Inhibition/Sexual Excitation Scales (SIS/SES): Gender similarities and differences. *Journal of sex research, 45*, 36-48.

Costa, P. T., & McCrae, R. R. (1989). NEO five-factor inventory (NEO-FFI). *Odessa, FL: Psychological Assessment Resources*, *3*.

Fernández del Río, E., Ramos-Villagrasa, P. J., Castro, Á., & Barrada, J. R. (2019). Sociosexuality and bright and dark personality: the prediction of behavior, attitude, and desire to engage in casual sex. *International journal of environmental research and public health*, 16, 2731.

Fruyt, F., van de Wiele, L., & van Heeringen, C. (2000). Cloninger's psychobiological model of temperament and character and the five factor model of personality. *Personality and Individual Differences*, 29, 441–452.

Gomes, A. L. Q., & Nobre, P. (2011). Personality traits and psychopathology on male sexual dysfunction: An empirical study. *The journal of sexual medicine*, *8*, 461-469.

Hřebíčková, M., & Urbánek, T. (2001). *NEO pětifaktorový osobnostní inventář*. Praha: Testcentrum.

Janssen, E., & Bancroft, J. (2007). The dual-control model: The role of sexual inhibition and excitation in sexual arousal and behavior. *The psychophysiology of sex*, *15*, 197-222.

Janssen, E., Vorst, H., Finn, P., & Bancroft, J. (2002a). The Sexual Inhibition (SIS) and Sexual Excitation (SES) Scales: I. Measuring sexual inhibition and excitation proneness in men. *Journal of sex research*, *39*, 114-126.

Janssen, E., Vorst, H., Finn, P., & Bancroft, J. (2002b). The sexual inhibition (SIS) and sexual excitation (SES) scales: II. Predicting psychophysiological response patterns. *Journal of Sex Research*, *39*, 127-132.

Kurpisz, J., M. Mak, M. Lew-Starowicz, K. Nowosielski, and J. Samochowiec. (2016). The relationship between personality structure and sexual response control in males. *The Journal of Sexual Medicine* 13, S216-S217.

Lippa, R. A. (2009). Sex differences in sex drive, sociosexuality, and height across 53 nations: Testing evolutionary and social structural theories. *Archives of sexual behavior*, 38, 631-651.

Penke, L., & Asendorpf, J. B. (2008). Beyond global sociosexual orientations: a more differentiated look at sociosexuality and its effects on courtship and romantic relationships. *Journal of personality and social psychology*, *95*, 1113.

Rettenberger, M., Klein, V., & Briken, P. (2016). The relationship between hypersexual behavior, sexual excitation, sexual inhibition, and personality traits. *Archives of Sexual Behavior, 45*, 219-233.

Sanders, S. A., Graham, C. A., & Milhausen, R. R. (2008). Sexual orientation and SESII–W. *Unpublished raw data*.

Schmitt, D. P. (2005). Sociosexuality from Argentina to Zimbabwe: A 48-nation study of sex, culture, and strategies of human mating. *Behavioral and Brain Sciences*, 28, 247-275.

Schmitt, D. P. (2007). Sexual strategies across sexual orientations: How personality traits and culture relate to sociosexuality among gays, lesbians, bisexuals, and heterosexuals. *Journal of Psychology & Human Sexuality*, 18, 183-214.

Velten, J., Scholten, S., & Margraf, J. (2018). Psychometric properties of the Sexual Excitation/Sexual Inhibition Inventory for Women and Men (SESII-W/M) and the Sexual Excitation Scales/Sexual Inhibition Scales short form (SIS/SES-SF) in a population-based sample in Germany. *PloS one*, 13(3).

Acknowledgements

The authors wish to thank AP for English proofreading. This study was supported by the Grant Agency of the Czech Republic, Czech Republic (GACR 17-11004S), by the Charles University Research Centre, Charles University, Czech Republic (UNCE 204056) and by the project LO1611, with a financial support from the Ministry of Education, Youth and Sports of the Czech Republic under the NPU I program.

Table 1

Partial correlations (*r*), controlled for age, between SIS/SES scales, NEO-FFI, and SOI-R total score and subscales.

		SOI-R Total	SOI-R Behaviour	SOI-R Attitude	SOI-R Desire	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
Heterosexual men	SES	.433***	.262***	.270***	.483***	.077	-.044	-.063	.056	.182**
	SIS1	-.022	-.088	-.026	.059	-.167**	-.095	-.011	.249***	-.019
	SIS2	-.365***	-.260***	-.358***	-.225***	-.137**	.102	.088	.189***	-.071
Non-heterosexual men	SES	.197	-.044	.047	.539***	.197	.028	.201	.064	.233
	SIS1	.030	.078	.023	-.047	-.179	-.132	-.155	-.052	.006
	SIS2	.046	.119	-.133	.144	.158	.123	.178	-.146	.108
Heterosexual women	SES	.433***	.204***	.285***	.508***	.183***	-.051	.015	.011	.217***
	SIS1	-.274***	-.260***	-.238***	-.126**	-.194***	.022	-.087*	.210***	-.075
	SIS2	-.452***	-.439***	-.347***	-.258***	-.125**	.147***	.055	.087*	-.071
Non-heterosexual women	SES	.577***	.397***	.298**	.665***	.252*	-.046	-.048	.111	-.002
	SIS1	-.121	-.033	-.199	-.042	-.373***	-.140	.025	.354***	.060
	SIS2	-.359***	-.318**	-.261*	-.271*	-.263*	-.049	.095	.266*	.021

* p < .05 ** p < .01 *** p < .001

Note: SES = Excitation Factor; SIS1 = Inhibition due to threat of performance failure; SIS2 = Inhibition due to threat of performance consequences; SOI-R = revised Sociosexual Orientation Inventory

Table 2 Descriptive statistics of the Sexual Inhibition/Sexual Excitation Scales (SIS/SES), a revised Sociosexual Orientation Inventory (SOI-R) and the NEO-Five Factor Inventory (NEO-FFI)

	Heterosexual men		Non-heterosexual men		Heterosexual women		Non-heterosexual women	
	M	SD	*M*	SD	*M*	SD	*M*	SD
SES	56.57	8.65	58.94	9.71	55.41	8.61	54.41	9.08
SIS1	29.82	6.08	30.66	5.72	33.09	5.82	32.38	6.06
SIS2	25.82	4.93	27.28	4.47	29.81	5.12	29.41	5.63
SOI-R Total	44.05	14.33	46.21	14.71	36.90	13.28	42.72	14.07
SOI-R Behaviour	9.60	5.77	11.02	6.81	9.11	5.24	10.14	5.67
SOI-R Attitude	19.60	6.71	19.87	6.80	16.81	6.80	20.70	6.33
SOI-R Desire	14.84	6.03	15.32	5.27	10.98	5.44	11.88	6.04
Extraversion	39.79	8.36	40.23	6.65	40.67	8.20	38.91	8.65
Agreeableness	40.81	6.40	41.83	6.61	42.83	6.15	43.54	5.62
Conscientiousness	40.33	7.67	43.17	7.99	40.78	8.84	39.09	8.81
Neuroticism	33.43	9.52	37.02	9.77	38.48	9.02	38.60	9.45
Openness	38.42	6.38	39.74	6.29	39.05	6.48	41.27	6.59